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Report 11172
10 June 1998

GENCORP
AEROJET

**Integrated Advanced Microwave Sounding Unit-A
(AMSU-A)**

Performance Verification Report

METSAT Phase Locked Oscillator Assembly,

P/N 1334360-1, S/N's F03 and F04

**Contract No. NAS 5-32314
CDRL 208**

Submitted to:

**National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771**

Submitted by:

**Aerojet
1100 West Hollyvale Street
Azusa, California 91702**

Aerojet

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AMSU-A VERIFICATION TEST REPORT
METSAT PHASE LOCKED OSCILLATOR ASSEMBLY

TEST ITEM:
AMSU-A PHASE LOCKED OSCILLATOR ASSEMBLY
P/N 1348360-1
SERIAL NUMBERS F03, F04

PREPARED FOR
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

PREPARED BY
GENCORP AEROJET
POST OFFICE BOX 296
AZUSA, CALIFORNIA 91702-0296

1.0 SUMMARY

Two Flight Model AMSU-A Phase Locked Oscillators (P/N 1348360-1, S/Ns F03 and F04) have been tested per AES Test Procedure AE-26758. The tests included vibration testing, thermal cycle testing, AM/FM Noise testing, and full functional testing. EMI/REO 2 Testing was not performed. (See test data for S/N F01). Both AMSU-A Phase Locked Oscillators satisfactorily passed all performance requirements of the AE-26633 Product specification.

During thermal cycling of PLO serial number F03, the oven and data logger momentarily lost power, including a loss of data. The unit did not experience any thermal stress. TAR 003134 describes the corrective action.

Prior to testing PLO serial number F04, power was applied to the unit. (+15v, -15v) the unit did not display the proper phase lock. Upon test equipment check out a connector was found to be defective. TAR 003133 describes the corrective action.

After completion of testing of PLO serial number F04 was installed into Receiver Assembly F02. Upon testing F02 Receiver Assembly the unit was found not to phase lock at ambient temperature. Removal of PLO Assembly F04 was required. R2 was the real issue. Solithane was secondary. Troubleshooting revealed excessive solithane on inner PLL Assembly cover inhibiting optimum grounding. Also, R2 was reselected which increased the lock range from -30° to +60°C. TAR 002737 describes the corrective action.

2.0 REQUIREMENTS

The acceptance test procedure, AE-26758, consists of tests designed to show compliance of the Phase Locked Oscillator with all requirements stated in the PLO product specification AE-26633. The tests reported herein demonstrate the acceptability of the AMSU-A PLO assemblies, and therefore compatability with the AMSU-A Receiver Assembly.

3.0 RESULTS

The results of the tests required in the Test Procedure AE-26758 are presented in the following section as test data. As shown on the test data sheets, the measured data passed all requirements.

4.0 TEST DATA

A summary of the test data is provided at the start of the section, and raw data for the AMSU-A PLO serial numbers F03 and F04 follows. Both PLO F03 and PLO F04 meet all requirements as defined in AE-26633, the PLO product specification. The following table summarizes how each unit meets and exceeds each requirement.

Summary of Test Results for AMSU-A Phase Locked Oscillator Testing
Serial Numbers F03 and F04

Paragraph	Description	Requirements	F03	F04
3.2.1.1	Input Voltage and Current	600 mA max, +15V 100 mA max, -15V	521 mA for +15V 66.5 mA for -15V	532 mA for +15V 57.8 mA for -15V
3.2.1.2	Operating Temperature	+1°C to +44°C	-10 to +60°C ***	-30°C to +60°C***
3.2.1.3	Start-up	All loads, -30°C and +60°C; in vacuum	-30°C and +60°C (Ambient pressure)	-30°C and +60°C (Ambient pressure)
3.2.1.4 & 3.2.1.5	Frequency Stability from 57.290344 GHz at 22°C	± 200 kHz	-8 kHz, -20 kHz	-5 kHz, -15 kHz
3.2.1.6	RF Output Power	17 to 20 dBm	18.9 dBm	19.7 dBm
3.2.1.7	Output Power Stability	< 1.5 dB	-0.4 dB +0.6 dB	-0.5 dB, +0.3 dB
3.2.1.8	Load VSWR	2.01:1 or less	Verified	Verified
3.2.1.9	AM Noise	< -130 dBc/Hz @ 1 MHz	-132 dBc/Hz @ 1 MHz -135 dBc/Hz @ >8 MHz*	-132 dBc/Hz @ 1 MHz -136 dBc/Hz @ >8 MHz*
3.2.1.10	FM Noise	< -100 dBc/Hz @ 1 MHz	-103 dBc/Hz @ 1 MHz -128 dBc/Hz @ >8 MHz*	-103 dBc/Hz @ 1MHz -133 dBc/Hz @ >8 MHz*
3.2.1.11	Spurious and Sub Harmonic Signals	< -90 dBc (No Spur in 110 MHz to 400 MHz)	Better than -92 dBc**	Better than -91 dBc**
3.2.1.12	Harmonics	<30 dBc	Below -66 dBc	Below -61 dBc
3.2.1.14	Warm-up time	<30 minutes	Verified	Verified
3.2.1.15	Grounding and Shielding		By Design	By Design
3.2.1.16	Input Voltage Protection		By Design	By Design
3.2.1.17	Reverse Polarity Protection		By Design	By Design
Environmental Testing				
Microphonics		AE-26633	TCXO Test	TCXO Test
Radiation Hardness		AE-26633	By Analysis	By Analysis
EMI/RFI		AE-26633	Not Required	Not Required
Vibration		AE-26633	Acceptance Level	Acceptance Level
Thermal Vacuum		AE-26633	Verified at Ambient pressure only	Verified at Ambient pressure only
Weight		2.00 lbs	2.00 lbs	2.00 lbs

* AMSU-A System Required Frequency
** Spectrum Analyzer Noise Floor = -92 dBm
*** PLO Locable in this range

The remainder of this report contains the raw data taken during the tests of the two flight PLOs. The data is arranged by the following segmentation:

- Section 1A: Initial Functional Test - F03
- 1B: Initial Functional Test - F04

- Section 2A: Acceptance Level Vibration - F03
- 2B: Acceptance Level Vibration - F04

- Section 3A: Frequency and Power Hysteresis - F03
- 3B: Frequency and Power Hysteresis - F04

- Section 4A: EMI/RE02 Testing - F03
- 4B: EMI/RE02 Testing - F04

- Section 5A: Final Functional Test - F03
- 5B: Final Functional Test - F04

- Section 6A: AM/FM Noise Levels - F03
- 6B: AM/FM Noise Levels - F04

Section 1A: Initial Functional Testing - F03

This section contains the results of a full functional test over temperature taken before the PLO (F03) endured 6 thermal cycles.

GENCORP
AEROJET

AEROJET, AZUSA OPERATIONS
Azusa, California
CAGE Code 70143

ENGINEERING CHANGE NOTICE

ADVANCE REL.

INCORPORATE

SHEET 1 OF 1

1. PROGRAM COMBINED AMSU	2. ECN NUMBER CAMSU- 1675	3. CONTRACT NUMBER NAS 5-32314	4. PREPARED BY / DATE / EXT MARK O'NEILL / 1.28.98 / 1305	5. DOCUMENT NUMBER AE-26758A	6. NEW REV. B
7. CHANGE CLASS IA IB <u>IP</u>	8. MULTIPLE DOCUMENTS AFFECTED YES <u>NO</u>	9. CHG TYPE <u>DOC CHG</u> HARDWARE SOFTWARE	10. HARDWARE PART NUMBER(S) MAND LTST N/A	11. DOCUMENT TITLE Phase Lock Oscillator (PLO) Assembly; Assembly Procedure, Tuning Procedure, and performance test procedure AMSU	12. DESCRIPTION OF CHANGE ITEM ZONE See Attached Redlined Spec Data Sheets

12. DESCRIPTION OF CHANGE
ITEM ZONE

See Attached Redlined Spec Data Sheets

F03

Urgent Routine

13. SIGNATURES	DATE	14. JUSTIFICATION / REASON FOR CHANGE Increased Test Data Sheet Readability	15. DISPOSITION OF MATERIAL ON ORDER IN STOCK INSTALLED	USE AS IS — — —	MODIFY N/A N/A N/A	SCRAP — — —	RETURN TO STORES — — —	
Design Verif., Dwg. N.A. OP		16. REMARKS/SPECIAL INSTRUCTIONS/TECHNICAL EVALUATION No procedural changes and no technical impact	20. CONFIGURATION MGR. J. J. Courant					
Qual Eng W. J. H. H. H.	2/12/98		21. DIST. CODE:					
PTL (Eng) O. P. P.	2/12/98		22. REL. DATE					
Mfg Eng D. J. H. H.	2/16/98							
Sysr Eng J. P. P.	2/16/98	17. NASA CONCURRENCE OF CLASSIFICATION N/A	18. CHANGE CODE A/O/I	19. PCCB CHAIRMAN / PMO: APPROVE DISAPPROVE DEFER	23. INCORPORATION Inc. By Design Verif.			DATE 2/17/98

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21 Jan 98

SHEET 2 OF 34
ECR NO. 1675

TEST DATA SHEET 1

Equipment Calibration (Paragraph 4.2.1.1)

~~Test Setup Verified:~~

~~Signature~~

Item	Description	Manufacturer	Model/Part Number	Calibration	Property Number
1					
2					
3					
4					
5					
6					
7					
8		See GU Test Setup			
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Shop Order No.: 431615

operation: _____

Unit Serial No.: F03

Date: 3-5-98

Test Engineer: Mark P. H.

Quality Assurance: _____

Govt. Rep: _____

SHEET 3 OF 34
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TEST DATA SHEET 2

UUT Verification and Ground Potentials Check (Paragraphs 4.1.2.2 and 4.1.2.4)

Test Setup Verified: NET

Signature [Signature]

Paragraph/Step	UUT Components	Part Number	Verify Presence	
4.1.2.2.	PLO faceplate	1348366-2	✓	
	VCGDO	1348351-1	✓	
	DRO	1348400-1	✓	
	Cable	1357793-4	✓	
	Filter	1357729-1	✓	
	Cable	1348430-1	✓	
	Cable	1348430-2	✓	
	Cable	1348430-3	✓	
	Wires	N/A	✓	
	Connector/Waveguide Savers Installed?		✓	

Paragraph/Step	Test		Required	Measurement	Pass/Fail
4.1.2.4 Step 1	Potential Difference				
	From	To	Required	Measurement	
	GUNN Power Supply RTN	Varactor Power Supply RTN	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	DRO Power Supply RTN, +12 V	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	DRO Power Supply RTN, -12 V	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 1, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 2, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 3, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Synthesized Sweeper Chassis	< 1.0 Vac	0.01	Pass

Shop Order No.: 431615
 Operation: 0040
 Unit Serial No.: F03
 Date: 3-5-98

Test Engineer: [Signature]
 Quality Assurance: Control 100 06 1998 7A 190
 GOVT. REP. [Stamp]

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TEST DATA SHEET 3 (Sheet 1 of 2)
Attenuator Determination (Paragraph 4.1.2.4)

Paragraph 4.1.2.4:

Step	Test	Expected	Measured	Pass/ Fail
5	Recommended LO Power	8 to 11.8 dBm	Recommended Mixer LO Drive Power $P_{opt} = 11.5$ dBm	N/A
6	Initial Attenuator Setting	N/A	AT1 = (DRO Output Power at A6-J1) - (Bandpass Filter Insertion Loss) - $P_{opt} =$ 3 dB	N/A
	Which dash number attenuator was chosen?	-1 to -11	AT1 Selected 1331516- <u>6</u>	N/A
13	+12 V Supply Voltage	$+12.0 \pm 0.1$ V	$V^+ = 12.00$ V	Pass
	+12 V Supply Current	< 75 mA	$I^+ = 40$ mA	
	-12 V Supply Voltage	-12.0 ± 0.1 V	$V^- = -12.0$ V	
	-12 V Supply Current	< 90 mA	$I^- = 62$ mA	
14	DRO Output Frequency and Power at A1-J4	<u>6.874841 GHz</u> ± 24 kHz 11 to 15 dBm	Freq _{DRO} = <u>6.87485 GHz</u> $P_{DRO} = 12.5$ dBm	Pass
15	Gunn Voltage	$+8.5 \pm 0.1$ V	$V_{gunn} = 8.50$ V	Pass
	Gunn Current	< 340 mA	$I_{gunn} = 284$ mA	
	Varactor Supply Voltage	5.0 ± 0.1 V	$V_{var} = 5.0$ V	
	Varactor Supply Current	< 5 mA	$I_{var} = 1.001$ mA	
16	PLO Output Frequency and Power	N/A 17 to 20 dBm	Freq _{PLO} = <u>5.319 GHz</u> $P_{PLO} = 17$ dBm	N/A Pass
18	Record IF Frequency and Power	2.291613 ± 0.0001 GHz N/A	IF Frequency = <u>2.2916</u> IF Power = <u>-33.8</u>	N/A
20	Record IF Frequency and Power	2.291613 ± 0.0001 GHz -30 to -40 dBm	IF Frequency = <u>2.29161</u> IF Power = <u>-33.8</u>	Pass

~~6.874817 to 6.874865 GHz~~
6.874841 \pm .000024 GHz

m.c. lull 3-6-98

-4: -33.2

5:1 214 -32.9

MAR 06 1998



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 21 Jan 98

TEST DATA SHEET 3 (Sheet 2 of 2)
 Attenuator Determination (Paragraph 4.1.2.4)

Paragraph 4.1.2.4 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
21	LO Power Level	8.0 to 12.0 dBm	LO Drive Power <u>10.9</u>	Pass
22	Record AT1 dash number	<u>N/A</u>	1331516- <u>6</u>	N/A
32	Record IF Frequency and Power	2.291613 \pm 0.0001 GHz	IF Frequency = <u>2.29161</u>	Pass
		-30 to -40 dBm	IF Power = <u>-33.2</u>	Pass
34	DRO Lock Alarm with 573 MHz Signal Off	← 14 ← 14.14	A1-FL6 = <u>-11.58</u> V	Pass

< -10 Volts

Shop Order No.: 431615
 operation: 0040
 Unit Serial No.: 503
 Date: 3-6-98

Test Engineer: M. A. Schell
 Quality Assurance: CONTROL MAR 06 1998 (24 790)
 GOVT. REP. (3243)

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TEST DATA SHEET 4
Voltage Regulator Continuity Test (Paragraph 4.1.3)

Test Setup Verified: GTB

Signature

Paragraph 4.1.3.3, Continuity Test:

Step	From end of wire #	From end of wire #	Expected Value	Measured Value	Pass/Fail
2	A4E5	R1-2	< 1 ohm	0.1 ohm	Pass
	A4E1	R1-1	< 1 ohm	0.1 ohm	Pass

Shop Order No.: 431615
operation: 0040
Unit Serial No.: F03
Date: 3-5-98

Test Engineer: Mark Ogden
Quality Assurance: Control (7A 190) MAR 06 1998
Govt. Rep.

TEST DATA SHEET 5 (Sheet 1 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Test Setup Verified: STB
Signature

Paragraph 4.1.4.1.2:

UUT Components	Part Number	Verify Presence
PLO Housing Assembly	1348366-1	✓
Voltage Regulator	1357979	✓
R1 (Resistor)	RER60F10R0R	✓
Wires	N/A	✓

m. qd. 7A 190
3-7-98

Paragraph 4.1.4.1.4:

Step	From	To	Wire Color	Expected	Measured	Pass/Fail
3	Continuity Checkout					
a.	A1FL1	A4E1	Red	< 1 ohm	0.3	Pass
	A1FL2	A4E3	Blk	< 1 ohm	0.1	Pass
	A1FL3	A4E7	Brn	< 1 ohm	0.2	Pass
	A1FL4	A4E2	Blu	< 1 ohm	0.1	Pass
	A1FL5	A4E4	Yel	< 1 ohm	0.4	Pass
	A1FL7	A4E9	Grn	< 1 ohm	0.3	Pass
b.	A4E6	A5VB	Gra	< 1 ohm	0.1	Pass
	A4E10	A5RTN	Grn	< 1 ohm	0.1	Pass
	A4E2	A6FL1	Blu	< 1 ohm	0.1	Pass
	A4E4	A6FL2	Yel	< 1 ohm	0.1	Pass
	A4E8	A6FL1-E3	Grn	< 1 ohm	0.2	Pass
	A1FL6	A6FL3	Wht	< 1 ohm	0.3	Pass
	A1J2	A5VT	Wht	Visual Verification No Measurement	N/A Present	Pass

m. 7A 190
0.1
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Step	Test	Expected Value	Measured Value	Pass/Fail
5	Measure voltage levels	+12.0 ± 0.5 V	A1-FL4 +12.1 V	Pass
		-12.0 ± 0.5 V	A1-FL5 -12.1 V	Pass
		8.5 ± 0.5 V	A5VB 8.495V	Pass
		+12.0 ± 0.5 V	A6FL1 +12.1 V	Pass
		-12.0 ± 0.5 V	A6FL2 -12.12 V	Pass

7A 190
3-7-98
m. q. 7A 190

TEST DATA SHEET 5 (Sheet 2 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.1.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
7	Continuity Test Wire #			
	9	< 1.0 ohm	0.2	Pass
	10	< 1.0 ohm	0.2	Pass
	11	< 1.0 ohm	0.1	Pass
	12	< 1.0 ohm	0.2	Pass
	13	< 1.0 ohm	0.3	Pass
	14	< 1.0 ohm	0.1	Pass
9	Measure Supply Voltages and Currents			
	Volt Meter 1	+15 ± 0.1 V	15.0	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0	Pass
	Current Meter 1	600 mA max	344 mA	Pass
	Current Meter 2	100 mA max	65.5 mA	Pass
	Faceplate A1FL4	+12.0 ± 0.5 V	12.1	Pass
	Faceplate A1FL5	-12.0 ± 0.5 V	-12.1	Pass
	DRO, A6FL1	+12.0 ± 0.5 V	12.1	Pass
	DRO, A6FL2	-12.0 ± 0.5 V	-12.1	Pass
	VCGDO, A5VB	+8.5 ± 0.5 V	8.50	Pass

PARA 4.1.4.1.4
STEPS 9+7
REVIEWED
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Paragraph 4.1.4.2.2:

UUT Components	Part Number	Verify Presence
UUT from Paragraph 4.1.4.1.2	N/A	✓
PLL/TCXO Assembly	1358332-1	✓
Cable Assembly	1348435-1	✓

Paragraph 4.1.4.2.4:

Step	Test	Expected Value	Measured Value	Pass/Fail
1	Potential Difference From +15 V RTN To:			
	Spectrum Analyzer Chassis	< 1.0 Vac	0.001 2.0 VAC	Pass
	Oscilloscope RTN	< 1.0 Vac	0.001 VAC	Pass

TEST DATA SHEET 5 (Sheet 3 of 5)
 Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
3	Continuity Test			
	A1FL4 to A3FL2	< 1.0 ohm	0.1 ohm	Pass
	A1FL5 to A3FL3	< 1.0 ohm	0.1 ohm	Pass
	A1FL4 to A3FL1	< 1.0 ohm	0.15 ohm	Pass
	A3FL1 to A2FL1	< 1.0 ohm	0.1 ohm	Pass
6	Voltage Measurement			
	A3FL2	+12.0 ± 0.5 V	+12.15	Pass
	A3FL3	-12.0 ± 0.5 V	-12.1	Pass
7	Repetition Rate	8 - 12 msec	8.9 msec	Pass
	Rise Time	0.9 - 3.5 msec	3.0 msec	Pass
	Fall Time	25 usec - 2 msec	400 usec msec	Pass
8	Output Power	1 - 4 dBm	3.6 dBm	Pass
	Output Frequency	572.90344 ± 0.003 MHz	572.9043 MHz	Pass
16	Volt Meter 1	+15 ± 0.1 V	15.0	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0	Pass
	Current Meter 1	600 mA max	518 520	Pass
	Current Meter 2	100 mA max	66 m. output 3/25	Pass
	PLO Lock Detect Voltage at A3FL4	← IV 0 to 1 V	59.47 mV m. output	Pass
17	RF Output Frequency	57.290344 GHz ± 200 kHz	57.290329 GHz	Pass
	RF Output Power	17 to 20 dBm	18.7 m. output 2/25	Pass
18	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .000024 GHz	6.874840 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	12.7	Pass
19	Did PLO acquire the Lock?	Yes	Yes	Pass

TEST DATA SHEET 5 (Sheet 4 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
23	Test with 3 dB attenuation in IF line (2.2 GHz) at room ambient			
	Volt Meter 1	+15 ± 0.1 V	15.0	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0	Pass
	Current Meter 1	600 mA max	520 mA	Pass
	Current Meter 2	100 mA max	66 mA	Pass
	PLO Lock Detect Voltage at A3FL4	← IV 0 to 1 V	56 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290322257 GHz	Pass
	RF Output Power	17 to 20 dBm	18.7	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .00024 GHz	6.874843 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	12.7 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass
24	Test with 3 dB attenuation in IF line (2.2 GHz) at +1°C			
	Volt Meter 1	+15 ± 0.1 V	+15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	504 mA	Pass
	Current Meter 2	100 mA max	64.6 mA	Pass
	PLO Lock Detect Voltage at A3FL4	← IV 0 to 1 V	45 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290333420 GHz	Pass
	RF Output Power	17 to 20 dBm	17.4 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .00024 GHz	6.874843 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	13 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass

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TEST DATA SHEET 5 (Sheet 5 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4:

Step	Test	Expected Value	Measured Value	Pass/Fail
24	Test with 3 dB attenuation in IF line (2.2 GHz) at +44°C			
(Cont)	Volt Meter 1	+15 ± 0.1 V	15.03	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.00	Pass
	Current Meter 1	600 mA max	534 mA	Pass
	Current Meter 2	100 mA max	68 mA	Pass
	PLO Lock Detect Voltage at A3FL4	<1V 0.61 V	97 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz -0.00024 GHz	57.290320 GHz	Pass
	RF Output Power	17 to 20 dBm	18.34 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz -0.00024 GHz	6.874860 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	12.33 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass
26	Test with no attenuation in IF line (2.2 GHz) at room ambient			
	Volt Meter 1	+15 ± 0.1 V	15.00	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.00	Pass
	Current Meter 1	600 mA max	524 mA	Pass
	Current Meter 2	100 mA max	-66.9 mA	Pass
	PLO Lock Detect Voltage at A3FL4	<1V 0.61 V	56 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz -0.00024 GHz	57.290315 GHz	Pass
	RF Output Power	17 to 20 dBm	18.64 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz -0.00024 GHz	6.874843 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	12.7 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass

Shop Order No.: 43615

Unit Serial No.: F03

Date: 3/25/98

Test Engineer: Mark Odahl

Quality Assurance: Control 850
MAR 30 '98

Govt. AEP. R. Rensen 4/1/98
4/20/98

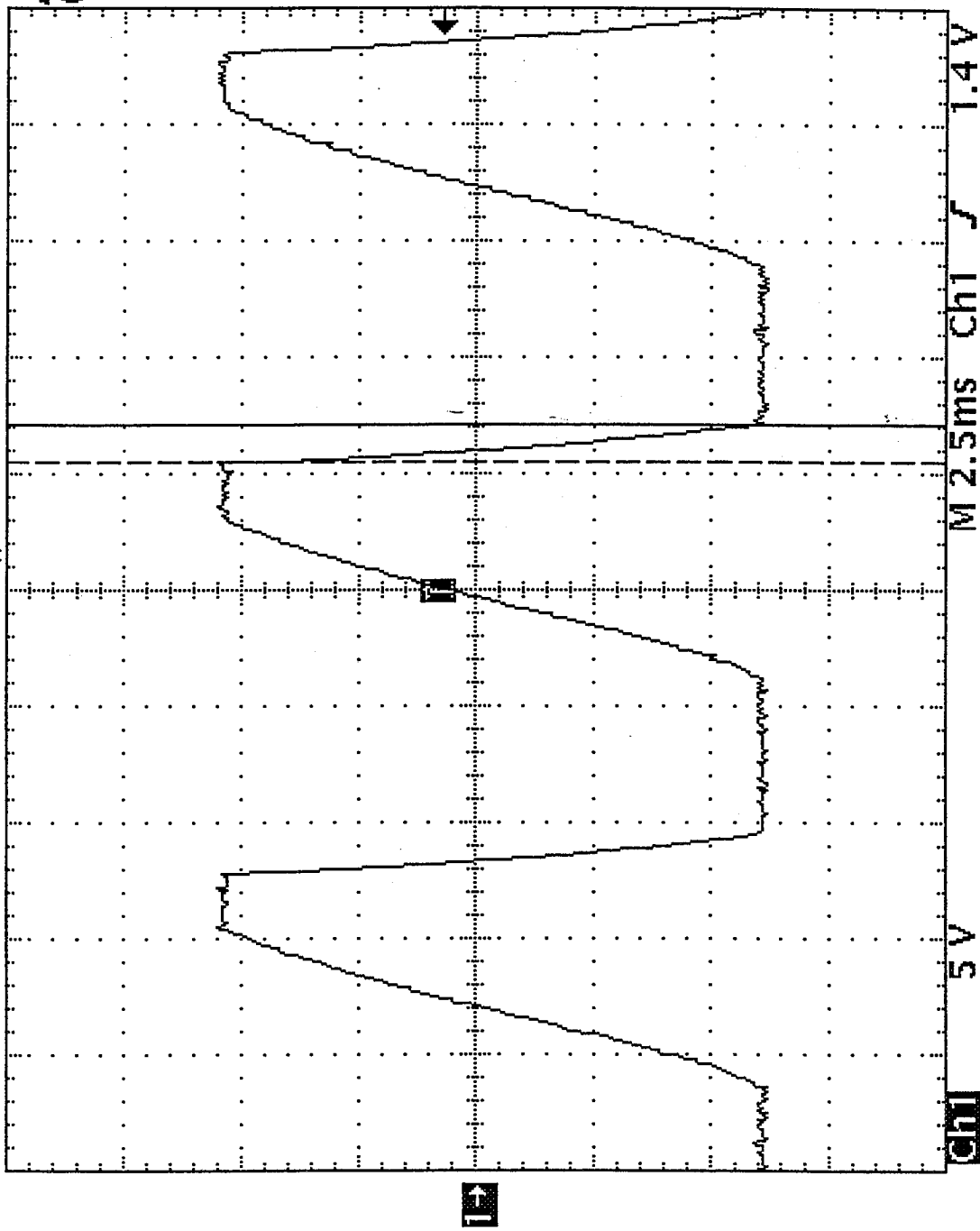
AE-26758A (EN) Part 114.24
Step 7

SIO 431615 ops 0008

3.12.98 M. Ojeda

Tek Stop: 20kS/s 3216 Acqs

APR 2 2 1008



12 Mar 1998
10:28:03

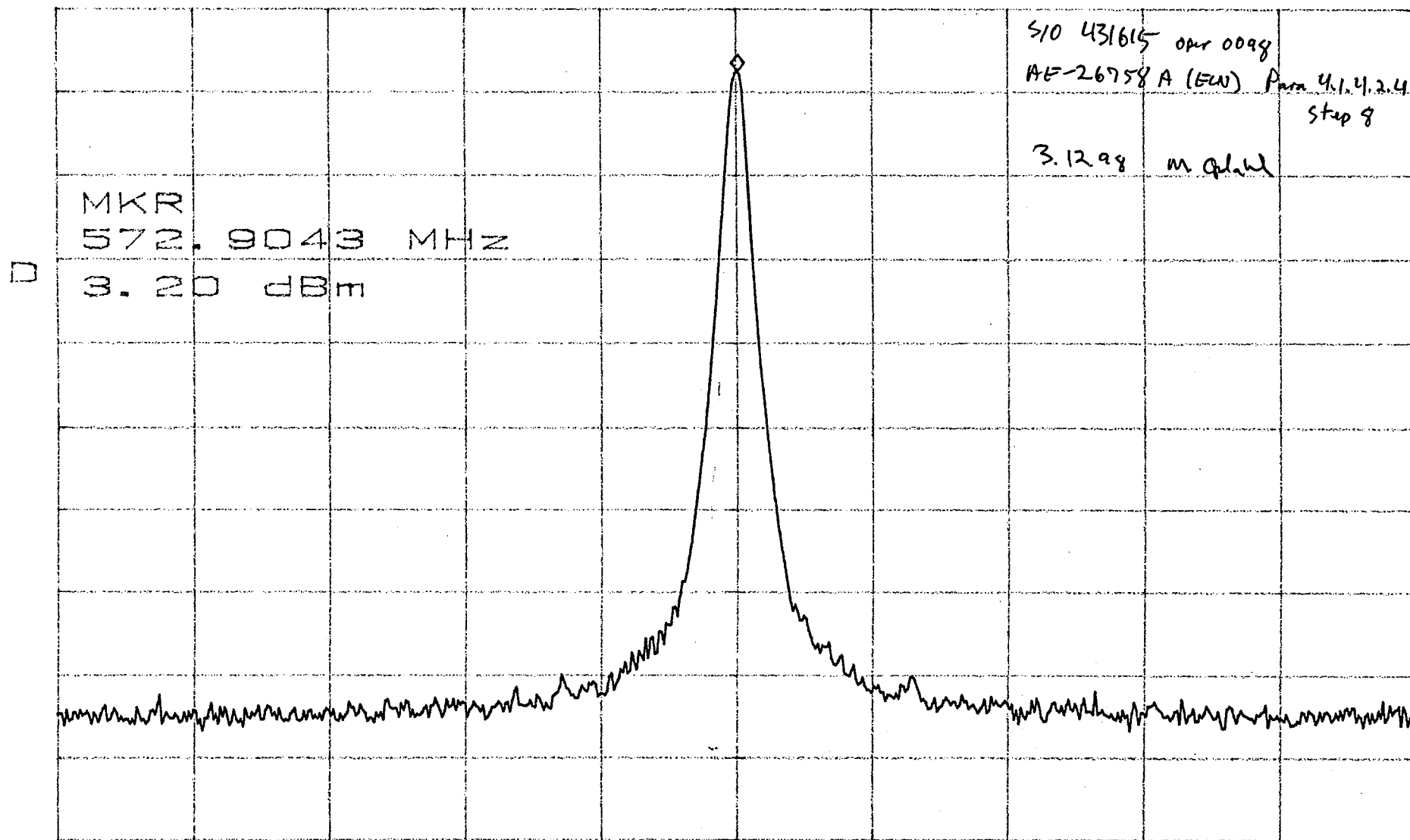
ATTEN 30dB

RL 10.7dBm

MKR 3.20dBm

572.9043MHz

10dB/



CENTER 572.9034MHz

SPAN 500.0kHz

*RBW 3.0kHz

VBW 3.0kHz

SWP 140ms

MPI 17-303 C
05 NOVEMBER, 97
PAGE 10 OF 13

TEST DATA SHEET 1
(Paragraph 4.1 Step 1 & 2)

SHOP ORDER NO.: 431615

DATE: 3.12.98

UNIT PART NO. 1348360-1

TEST
ENGINEER: Mark Cahill

SPD S/N: 52

QUALITY
ASSURANCE: Richie Stelly (24 190) MAR 17 98

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>MODEL/PART NUMBER</u>	<u>CALIBRATION DUE DATE</u>	<u>PROPERTY NUMBER</u>
	Power Supply	HP	6227B	4 Oct 98	48010
	Power Supply	HD 6114A	6114A	30 Jun 99	49791
	DVM	HP	3478A	21 May 98	45779
	DVM	HP	3478A	27 Aug 98	48871
	DVM	HP	3478A	24 Jul 98	47351
	DVM	HP	34401A	20 Feb 99	L-509311
	DVM	HP	3478A	18 Jun 98	47356
	DVM	HP	3478A	21 Nov 98	46915
	Oscope	Tek	TDS380	1-20-99	C00200083
	Decade Box	Omni Supply	DB 877	9-15-99	47768
	Attenuator	TRG	U-Band	9-26-98	C800849
	Analyzer	HP	Q563E	5-22-98	C00200095
	Power meter	Anritsu	ML83A	12-8-98	L508915
	Power sensor	Anritsu	MP716A	12-8-98	54202
	Plotter	HP	7400A	Not rec'd	47222

AEROJET PROPRIETARY DOCUMENT

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TEST DATA SHEET 2

(Paragraph 4.1 Step 4)

TEST From +12v Power Supply RTN To	MEASURED	REQUIRED	PASS/FAIL
8566B Spectrum Analyzer Chassis	.01	< 0.1v	Pass
DVM #1 Common	.01	< 0.1v	Pass
DVM #2 Common	.01	< 0.1v	Pass
DVM #3 Common	.01	< 0.1v	Pass
DVM #4 Common	.01	< 0.1v	Pass
DVM #5 Common	.01	< 0.1v	Pass
DVM #6 Common	.01	< 0.1v	Pass
DVM #7 Common	.01	< 0.1v	Pass
Oscilloscope RTN	.01	< 0.1v	Pass

SHOP ORDER NO.: 431615 DATE: 3.12.98

UNIT S/N: F03 TEST ENGINEER: Mark Golub

QUALITY ASSURANCE: R. H. H. H. 

TEST DATA SHEET 3

(Paragraph 4.1)

TEST SETUP Verified: Mark Gohlf

SIGNATURE

STEP	TEST	MEASURED	MEASURED AFTER C25 SOLDERED IN PLACE	PASS/FAIL
12 to 15	A2E1, A2E2 Voltage Check	A2E1= <u>-1.29</u> V A2E2= <u>1.44</u> V	A2E1= <u>-1.30</u> V A2E2= <u>1.44</u> V	N/A
	Calculate Percent ** Difference By ABS ((E _a -E _b)/E _a) X 100	<u>11</u> %	<u>11</u> %	N/A
	Is % Difference less Than 25%	<u>X</u> Yes No	<u>X</u> Yes No	* Pass
15, 19	Record C25 Value	C25= <u>14.3</u> pF	C25= <u>14.3</u> pF	N/A
21	Decade Box Setting Minimize Voltage	N/A N/A	<u>4.14</u> KOhms <u>.03</u> V	N/A N/A
22	Record R2 Value	N/A	R2= <u>4.12</u> KOhms	N/A

* REQUIREMENT = YES = PASS

** WHERE E_a IS THE LARGER AND E_b IS THE SMALLER OF THE MEASURED VOLTAGES.

UNIT PART NO. 1348360-1

UNIT SERIAL NO.: F03

SHOP ORDER NO.: 431615

TEST ENGINEER: Mark Gohlf

QUALITY ASSURANCE: R. Hickey

DATE: 3.14.98

TECHNICIAN: N/A - Mark Gohlf

RE-TUNED, Invalid,
See next page

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TEST DATA SHEET 3

(Paragraph 4.1)

TEST SETUP Verified: <u><i>Mark G. Schul</i></u> SIGNATURE				
STEP	TEST	MEASURED	MEASURED AFTER C25 SOLDERED IN PLACE	PASS/FAIL
12 to 15	A2E1, A2E2 Voltage Check	A2E1= <u>- 1.08</u> V A2E2= <u>1.18</u> V	A2E1= <u>- .989</u> V A2E2= <u>1.067</u> V	N/A
	Calculate Percent ** Difference By ABS ((E _a -E _b)/E _a) X 100	<u>17</u> %	<u>7</u> %	N/A
	Is % Difference less Than 25%	<u>X</u> Yes No	<u>X</u> Yes No	* <u>Pass</u>
15, 19	Record C25 Value	C25= <u>10</u> pF	C25= <u>10</u> pF	N/A
21	Decade Box Setting Minimize Voltage	N/A N/A	<u>4400</u> Ohms <u>4</u> mV	N/A N/A
22	Record R2 Value	N/A	R2= <u>4640</u> Ohms	N/A

* REQUIREMENT = YES = PASS

** WHERE E_a IS THE LARGER AND E_b IS THE SMALLER OF THE MEASURED VOLTAGES.

UNIT PART NO. 1348360-1 UNIT SERIAL NO.: F03

SHOP ORDER NO.: 431615

TEST ENGINEER: M. Schul

QUALITY ASSURANCE: (74/268) MAR 30 '98

DATE: 3/22/98 TECHNICIAN: M. Schul

AEROJET PROPRIETARY DOCUMENT

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TEST DATA SHEET 4
(Paragraph 4.1)

STEP	TEST	MEASURED	EXPECTED	PASS/FAIL
25	Voltage Measurement	A2E1= <u>-1.09</u> V A2E2= <u>1.82</u> V Sum: <u>.09</u> V	N/A	N/A
28	Voltage Measurement	A2E1= <u>-1.09</u> V A2E2= <u>1.83</u> V Sum: <u>.095</u> V	N/A	N/A
29	a) +15v voltage +15v current -15v voltage -15v current	<u>15.0</u> V <u>524</u> mA <u>-15.0</u> V <u>-66.5</u> mA	+15v \pm 0.1v 600 mA max -15v \pm 0.1v 100 mA max	Pass
	b) 57.290344GHZ RF output	<u>18.1</u> dBm	18.5dBm \pm 1.5dB	Pass
	c) 6.87GHz RF output	<u>11.5</u> dBm	12dBm \pm 2.0dB	Pass

UNIT PART NO. B48360-1 SHOP ORDER NO.: 431615

UNIT SERIAL NO.: F83 TEST ENGINEER: Mark Q. [Signature]

DATE: 3.12.98 QUALITY ASSURANCE: [Signature] MAR 17 98 74 190

RE-TUNED, Invalid. See next page.

TEST DATA SHEET 4

(Paragraph 4.1)

STEP	TEST	MEASURED	EXPECTED	PASS/FAIL
25	Voltage Measurement	A2E1= <u>- .87</u> V A2E2= <u>1.40</u> V Sum: <u>-17</u> mV	N/A	N/A
28	Voltage Measurement	A2E1= <u>- .80</u> V A2E2= <u>1.48</u> V Sum: <u>.050</u> V	N/A	N/A
29	a) +15v voltage +15v current -15v voltage -15v current	<u>+15.0</u> V <u>+591</u> mA <u>-15.0</u> V <u>66.5</u> mA	+15v \pm 0.1v 600 mA max -15v \pm 0.1v 100 mA max	Pass
	b) 57.290344GHZ RF output	<u>18.7</u> dBm	18.5dBm \pm 1.5dB	Pass
	c) 6.87GHz RF output	<u>12.7</u> dBm	12dBm \pm 2.0dB	Pass
<p>UNIT PART NO. <u>1348360-1</u> SHOP ORDER NO.: <u>431615</u></p> <p>UNIT SERIAL NO.: <u>F03</u> TEST ENGINEER: <u>Mark G. Hill</u></p> <p>DATE: <u>3/22/98</u> QUALITY ASSURANCE: <u>(7A) 268</u> MAR 30 '98</p>				

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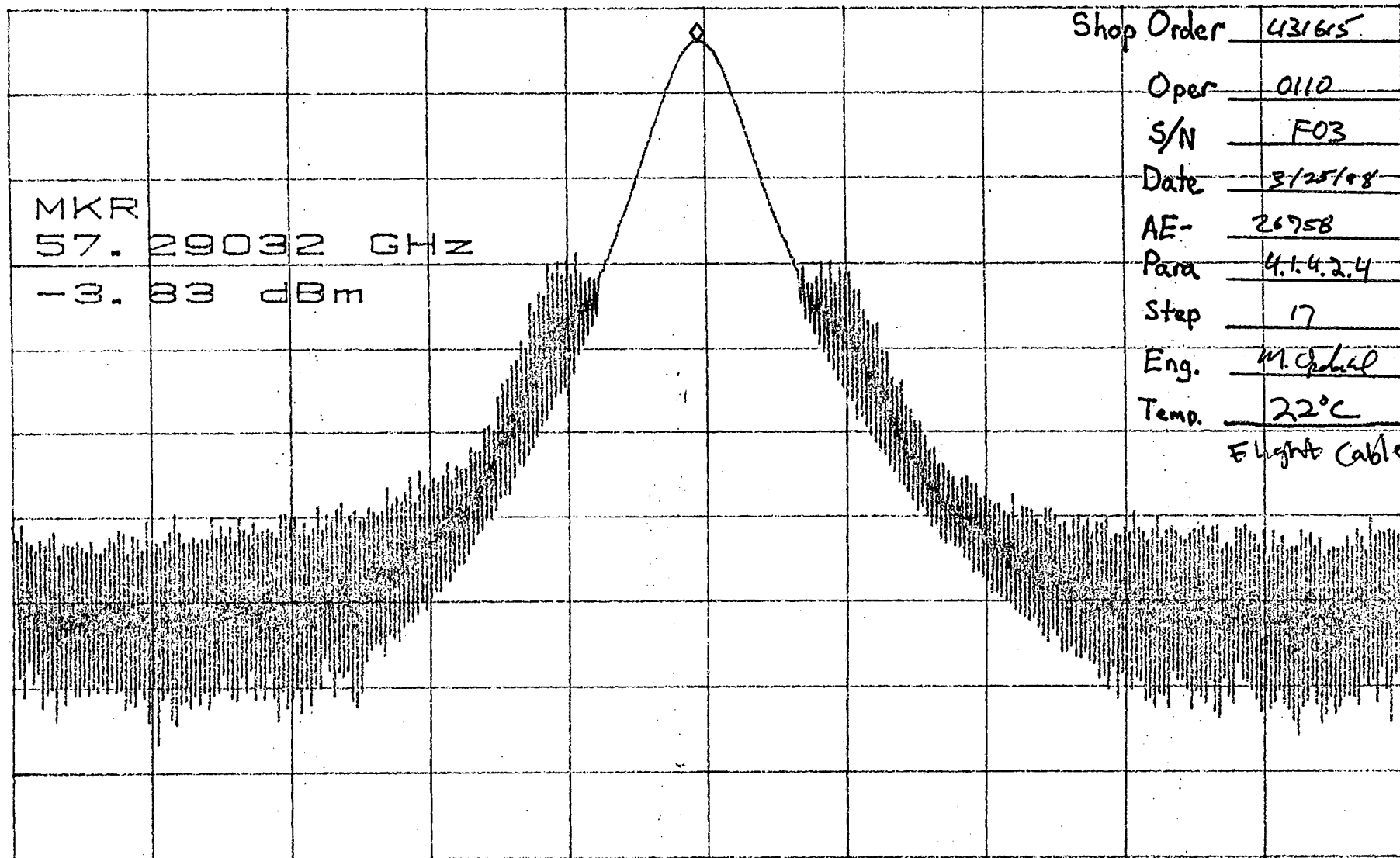
L 30.0dB

RL 0dBm

10dB/

MKR -3.83dBm

57.29032GHz



Shop Order 43165

Oper 0110

S/N F03

Date 3/25/08

AE- 26758

Para 4.1.4.2.4

Step 17

Eng. M. Chahal

Temp. 22°C

Flight Cable

CENTER 57.29037GHz

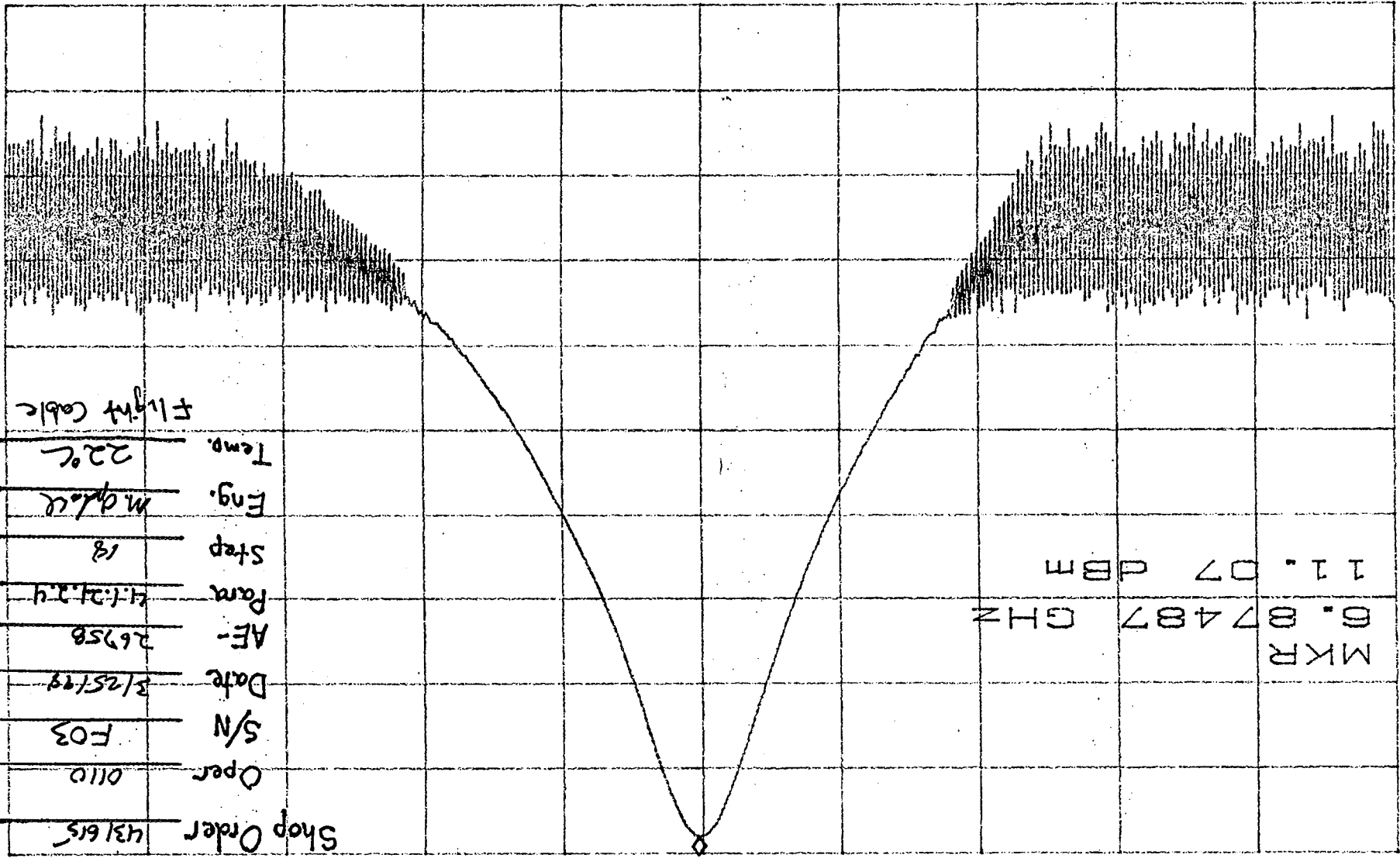
SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB
 MKR 11.07dBm
 6.87487GHz

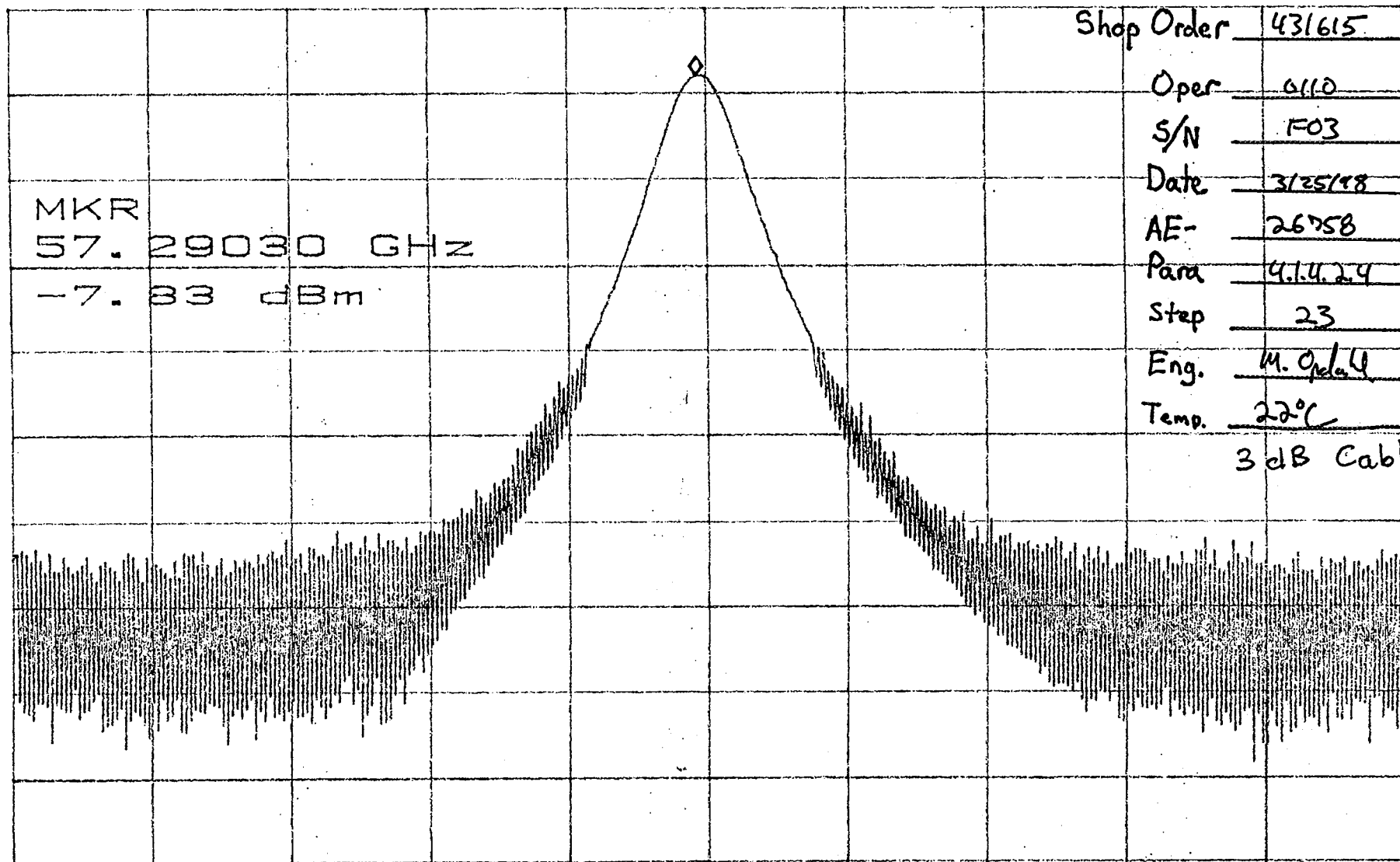


CENTER 6.87484GHz
 SPAN 10.00MHz
 *RBW 300kHz VBW 300kHz SWP 50.0ms

L 30.0dB
RL 0dBm

10dB/

MKR -7.83dBm
57.29030GHz



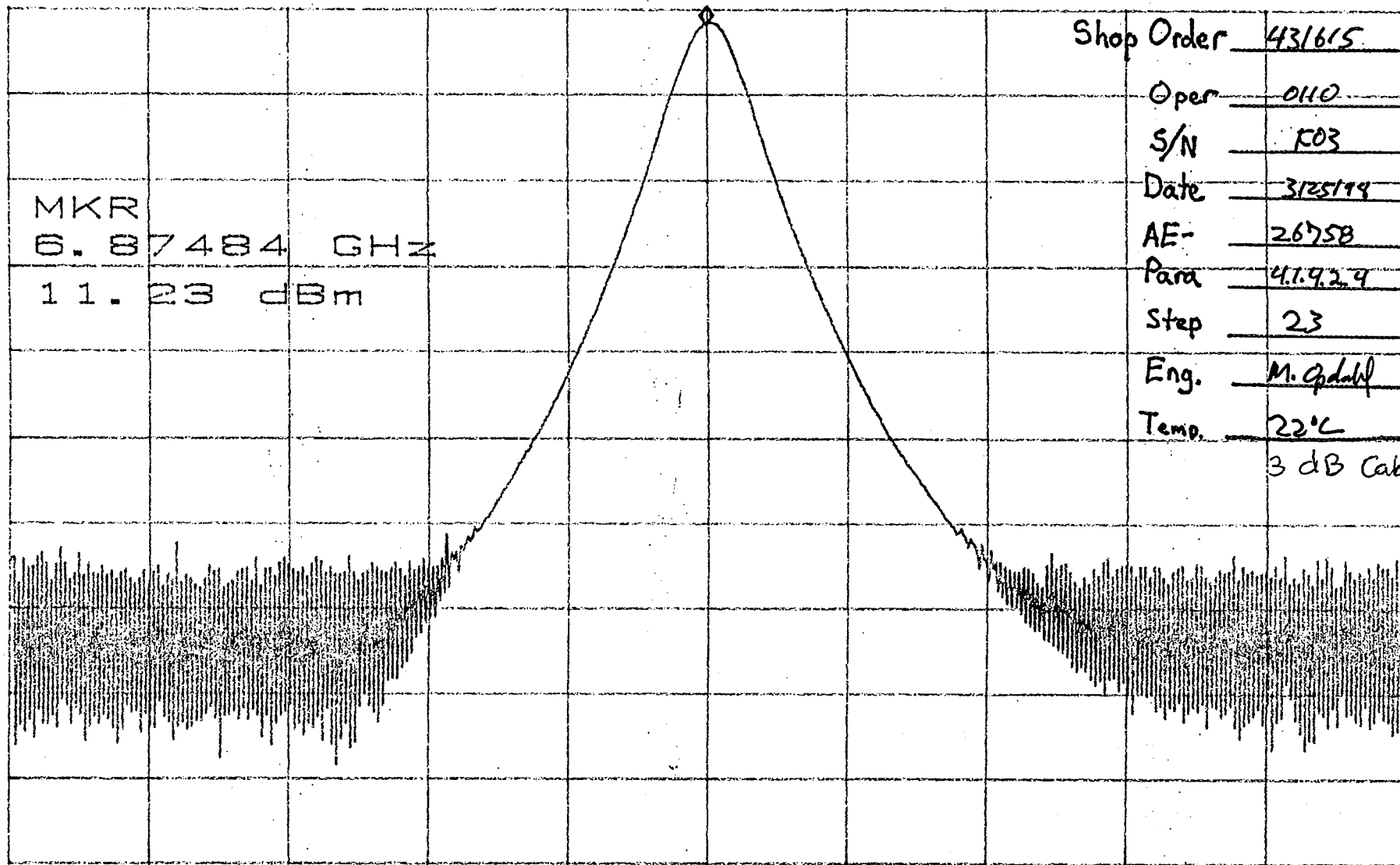
Shop Order 431615
Oper 6110
S/N F03
Date 3/25/18
AE- 26758
Para 4.1.4.24
Step 23
Eng. M. Orelan
Temp. 22°C
3 dB Cable

CENTER 57.29037GHz SPAN 10.00MHz
*RBW 300kHz VBW 300kHz SWP 50.0ms

ATTEN 30dB
RL 12.9dBm

MKR 11.23dBm
6.87484GHz

10dB/



Shop Order 431615

Oper 0110

S/N K03

Date 3/25/99

AE- 26758

Para 4.1.9.2.9

Step 23

Eng. M. G. Dahl

Temp. 22°C

3 dB Cable

CENTER 6.87484GHz
*RBW 300kHz VBW 300kHz

SPAN 10.00MHz
SWP 50.0ms

L 30.0dB

RL 0dBm

10dB/

MKR -7.33dBm

57.29032GHz

Shop Order 431615

Oper 0110

S/N F03

Date 3/25/98

AE- 26758

Para 4.1.4.2.4

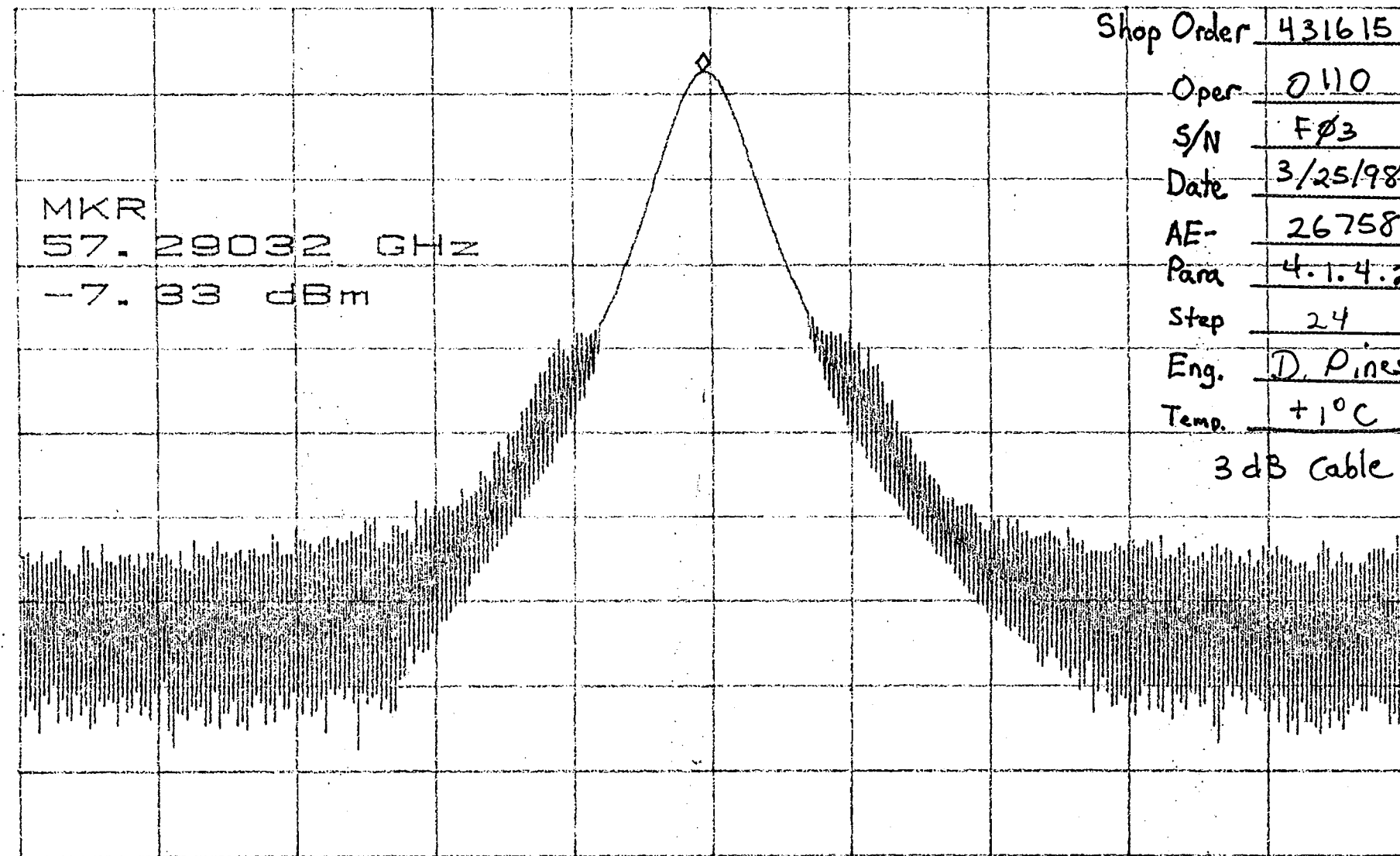
Step 24

Eng. D. Pines

Temp. +1°C

3dB Cable

MKR
57.29032 GHz
-7.33 dBm



CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

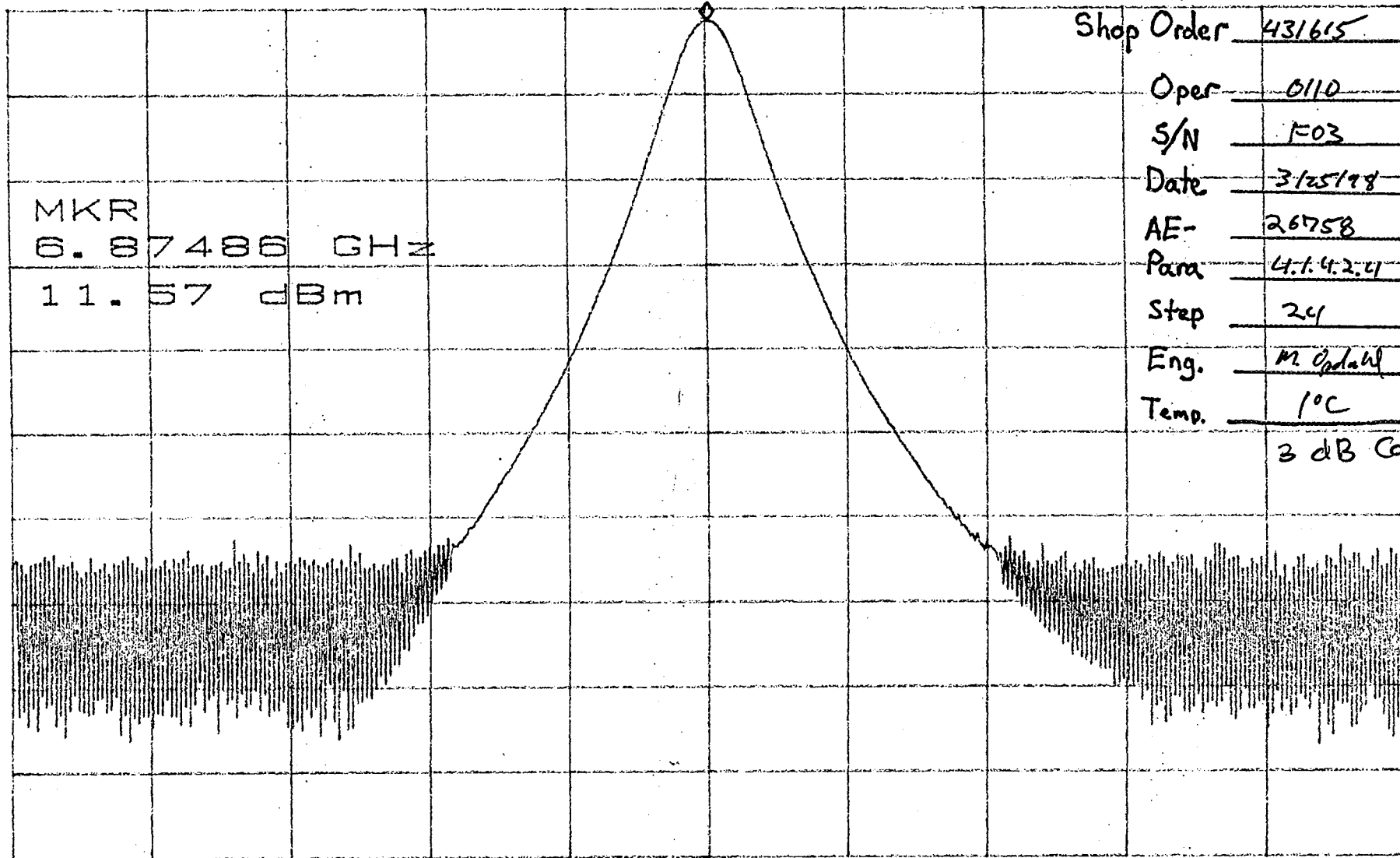
VBW 300kHz

SWP 50.0ms

ATTEN 30dB
RL 12.9dBm

10dB/

MKR 11.57dBm
6.87486GHz



CENTER 6.87484GHz SPAN 10.00MHz
*RBW 300kHz VBW 300kHz SWP 50.0ms

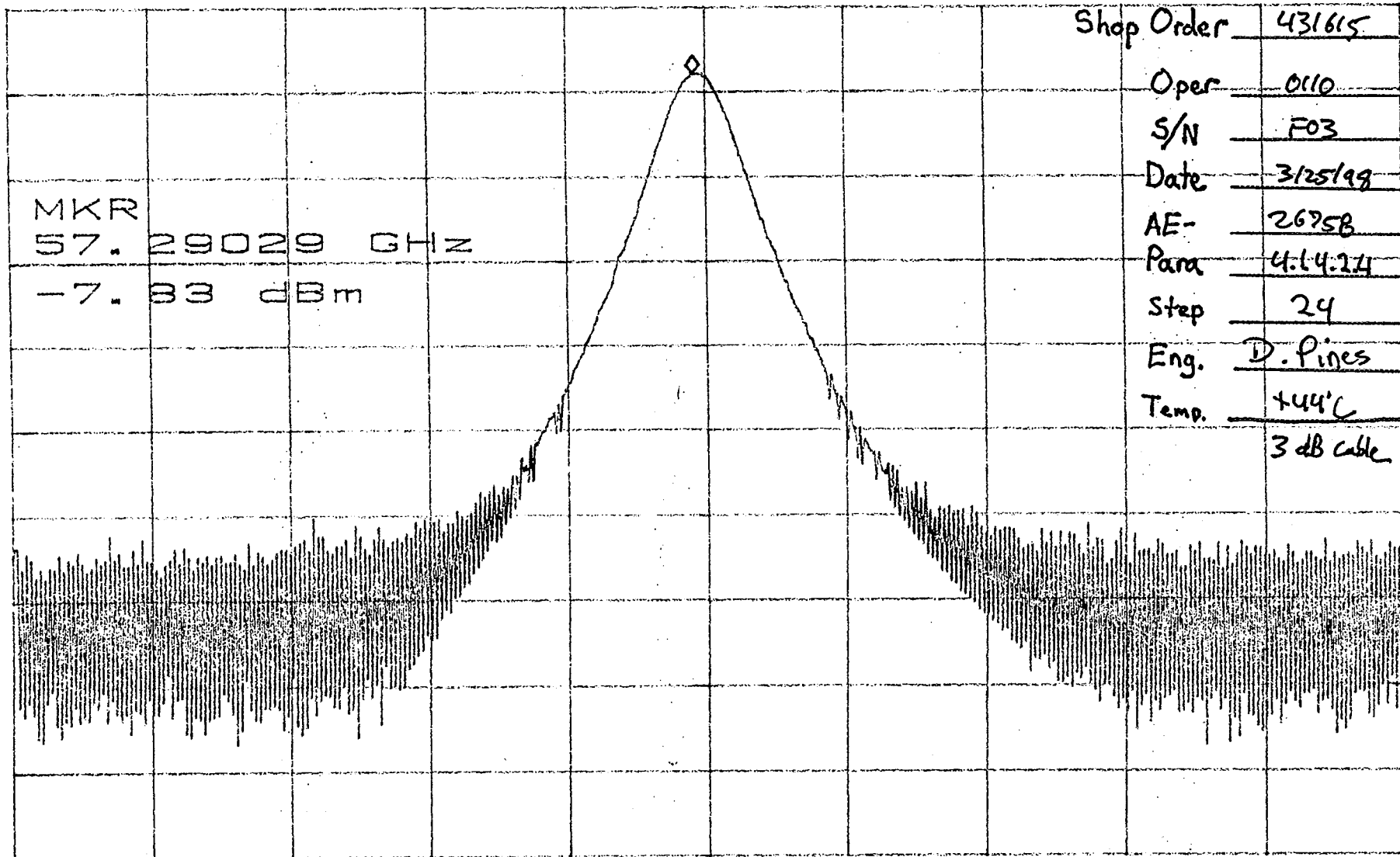
L 30.0dB

RL 0dBm

10dB/

MKR -7.83dBm

57.29029GHz



Shop Order 431615

Oper 0110

S/N F03

Date 3/25/99

AE- 26758

Para 4.14.24

Step 24

Eng. D. Pines

Temp. +44°C

3 dB cable

CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB

RL 12.9dBm

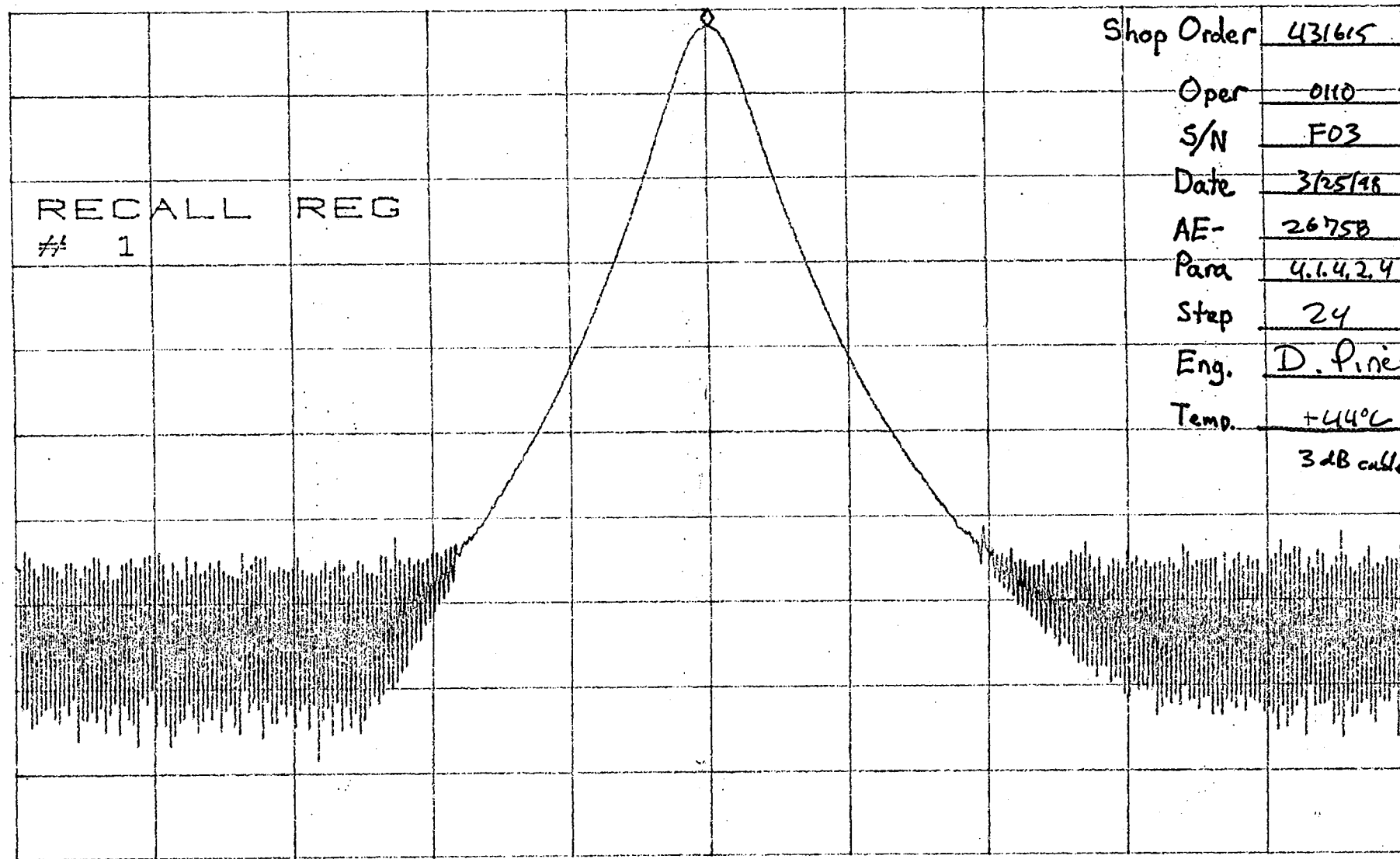
MKR 10.90dBm

10dB/

6.87486GHz

Shop Order	431615
Oper	0110
S/N	F03
Date	3/25/98
AE-	2675B
Para	4.1,4.2,4
Step	24
Eng.	D. Pines
Temp.	+44°C
	3dB cable

RECALL REG
1



CENTER 6.87484GHz

SPAN 10.00MHz

*RBW 300kHz

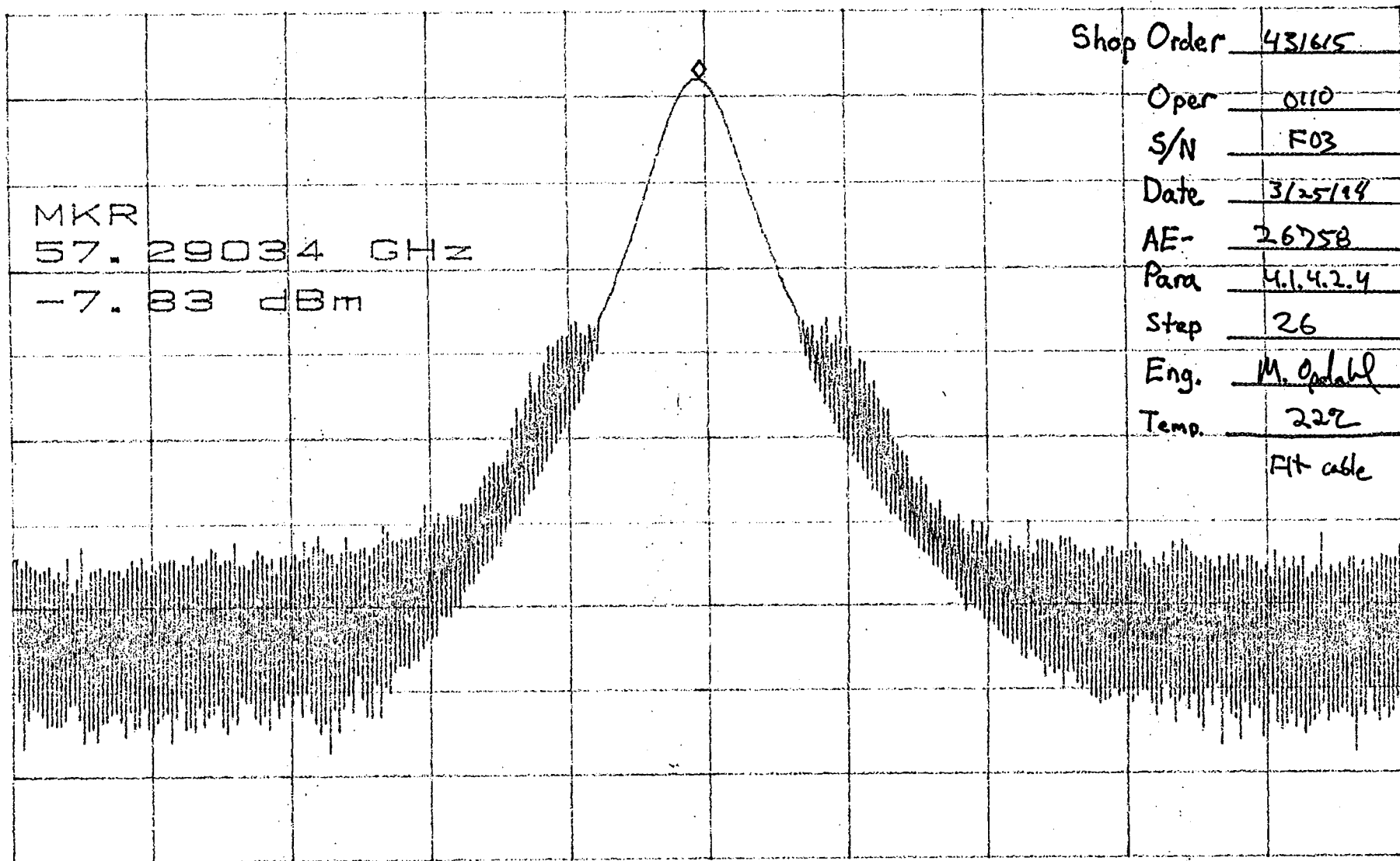
VBW 300kHz

SWP 50.0ms

L 30.0dB
RL 0dBm

10dB/

MKR -7.83dBm
57.29034GHz

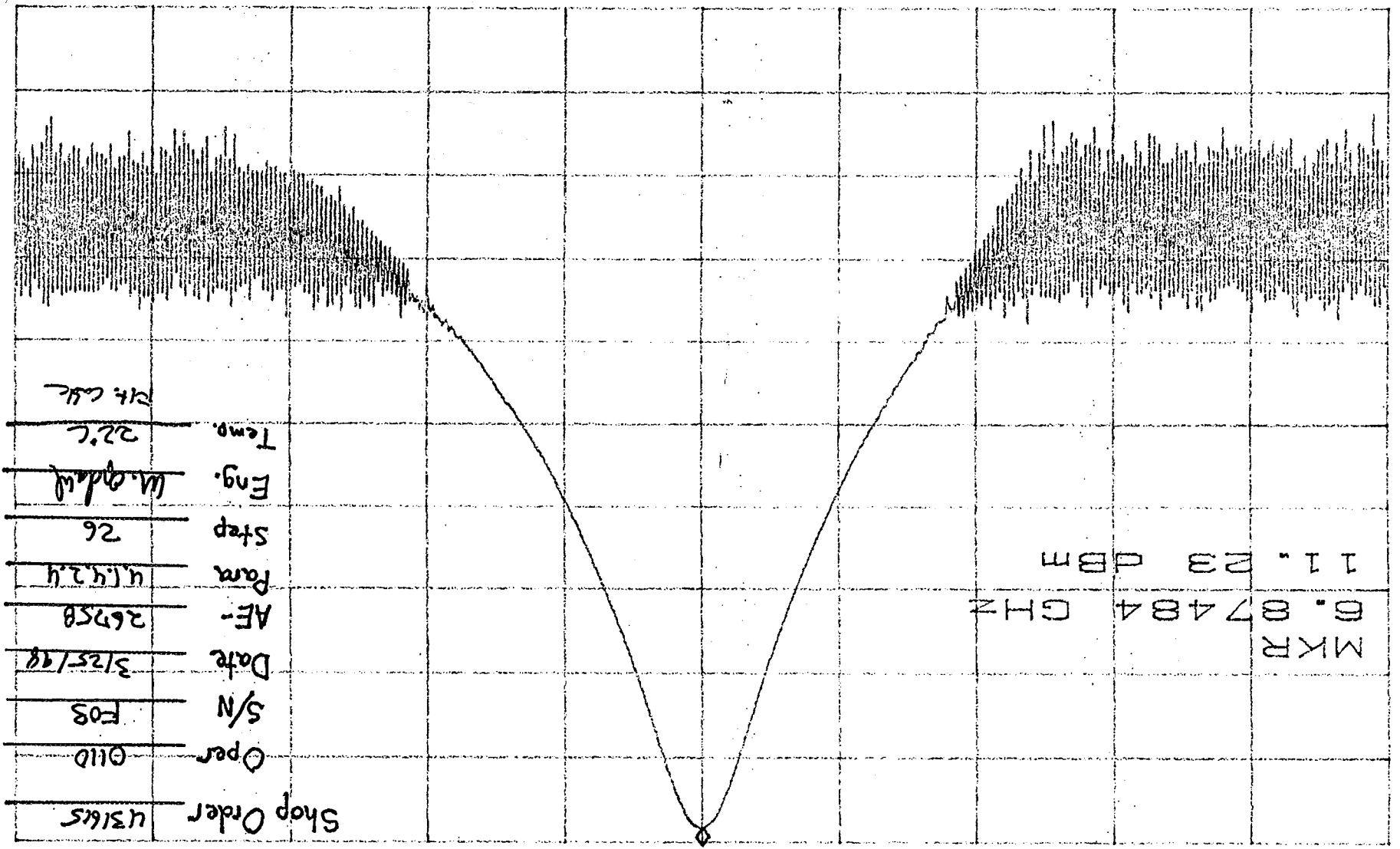


MKR
57.29034 GHz
-7.83 dBm

Shop Order 431615
Oper 0110
S/N F03
Date 3/25/94
AE- 26758
Para 4.1.4.2.4
Step 26
Eng. M. Opatohl
Temp. 222
Fit cable

CENTER 57.29037GHz SPAN 10.00MHz
*RBW 300kHz VBW 300kHz SWP 50.0ms

CENTER 6.87484GHZ
 SPAN 10.00MHZ
 *RBW 300KHZ VBW 300KHZ SWP 50.0ms



ATTEEN 30DB
 RL 12.9dBm
 MKR 11.23dBm
 6.87484GHZ
 10DB/

MKR
 6.87484 GHZ
 11.23 DBM

6BA

TEST DATA SHEET 8 (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Test Setup Verified: STET PRE-Environmental CPT
Signature: STET

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.005	Pass
	Spectrum Analyzer	< 1.0 Vac	.004	Pass
	Frequency Counter Chassis	< 1.0 Vac	.002	Pass
	Power Meter Chassis	< 1.0 Vac	.003	Pass
4	Evacuate vacuum chamber and record pressure	< 10^{-2} torr	Pressure = <u>N/A</u> Ambient	N/A *
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = <u>22.1</u> °C	Pass
			TC2 = <u>22.6</u> °C	N/A
			TC3 = <u>21.5</u> °C	N/A
6	DRO L/A	< 10^{-6} V	DRO L/A = <u>56</u> mV	Pass
	PLO L/A	< 10^{-6} V	PLO L/A = <u>44</u> mV	Pass
	Is PLO locked?	Yes	Yes <u>X</u> No	Pass
7	PLO Frequency	57.290344 GHz \pm 200 kHz	Freq. = <u>57.290 326 76</u> GHz	Pass
	PLO Power	17 to 20 dBm	P = <u>18.9</u> dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 \pm 0.1 V	VM1 = <u>15.0</u> V	Pass
	VM2 Voltage	-15 \pm 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>520</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>66.2</u> mA	Pass
	DRO L/A Voltage	< 10^{-6} V	DRO L/A = <u>56</u> mV	Pass
12	PLO L/A Voltage	< 10^{-6} V	PLO L/A = <u>49</u> mV	Pass
	RF Output Power and Frequency	17 to 20 dBm	P = <u>18.9</u> dBm	Pass
		57.290344 GHz \pm 200 kHz	Freq. = <u>57.290 326 85</u> GHz	Pass
13	Baseplate Temp. (TC1)	TC1 = 22 ± 2 °C	TC1 = <u>22.2</u> °C	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 \pm 0.05 V	+Voltage = <u>15.19</u> V	Pass
		-15.2 \pm 0.05 V	-Voltage = <u>-15.20</u> V	Pass
		57.290344 GHz \pm 200 kHz	Freq. = <u>57.290 326 712</u> GHz	Pass
		17 to 20 dBm	P = <u>18.9</u> dBm	Pass

* Record data only if performing test under vacuum.

SHEET 13 OF 34
 TEST NO. 1675

AE-26758A
 21 Jan 98

68A
TEST DATA SHEET # (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

~~Post Thermal Cycling CPT~~
~~Pre-Environmental CPT~~

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage ± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.81</u> V	Pass
		-14.8 ± 0.05 V _{.0002 GHz}	-Voltage = <u>-14.83</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29032665</u> GHz	Pass
		17 to 20 dBm	P = <u>18.9</u> dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
16	Power level of 114.58 GHz signal	< -10 dBm	Power of 114.58 GHz = <u>-79</u> dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>10 Hz</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>-28</u> dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ± 2°C	TC1 = <u>1.4°C</u>	Pass
			TC2 = <u>1.7°C</u>	N/A
			TC3 = <u>1.0°C</u>	N/A
		0 - 1V	DRO L/A = <u>.047</u> V	Pass
		0 - 1V	PLO L/A = <u>.042</u> V	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>508</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>64.11</u> mA	Pass
	DRO L/A Voltage	<u>< 1V</u> 0 to 1	DRO L/A = <u>.047</u> V	Pass
	PLO L/A Voltage	<u>< 1V</u> 0 to 1	PLO L/A = <u>.042</u> V	Pass
	RF Output Power	17 to 20 dBm _{.0002 GHz}	Power = <u>19.5</u> dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.290328476</u> GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.2</u> V	Pass
		-15.2 ± 0.05 V _{.0002 GHz}	-Voltage = <u>-15.2</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290328463</u> GHz	Pass
		17 to 20 dBm	Power = <u>19.5</u> dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.8</u> V	Pass
		-14.8 ± 0.05 V _{.0002 GHz}	-Voltage = <u>-14.8</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290328452</u> GHz	Pass
		17 to 20 dBm	Power = <u>19.5</u> dBm	Pass

68A

TEST DATA SHEET 6 (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

Post Thermal Cycling CRT
Pre-Environmental CPT

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = -76 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .20 dB Peak	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ± 2°C	TC1 = 44.5°C	Pass
			TC2 = 44.8°C	N/A
			TC3 = 44.5°C	N/A
		0 - 1V	DRO L/A = 109 mV	Pass
		0 - 1V	PLO L/A = 88 mV	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 534 mA	Pass
	IM2 Current	100 mA max.	IM2 = 68 mA	Pass
	DRO L/A Voltage	0 to 1 V	DRO L/A = 109 mV	Pass
	PLO L/A Voltage	0 to 1 V	PLO L/A = 88 mV	Pass
	RF Output Power and	17 to 20 dBm	Power = 18.1 dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = 57.2903772 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.19 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.2 V	Pass
		57.290344 GHz ± 200 kHz	Freq. = 57.2903773 GHz	Pass
		17 to 20 dBm	Power = 18.1 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.6 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.77 V	Pass
		57.290344 GHz ± 200 kHz	Freq. = 57.29037745 GHz	Pass
		17 to 20 dBm	Power = 18.1 dBm	Pass

SHEET 15 OF 34
 NO 1675

AE-26758A
 21 Jan 98

684
TEST DATA SHEET 6 (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont): *Post Thermal Cycling CPT*
Pre-Environmental CPT

Step	Test	Expected	Measured	Pass/Fail
22	Spurious and Sub	-200 to -90 dBc	See Notes	Pass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = <u>-75</u> dBm	Pass
Load VSWR and Frequency Pulling				
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>5112</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>-37</u> dB	N/A

Shop Order No.: 431615
 Operation: 0110
 Unit Serial No.: F03
 Date: 3128/98

Test Engineer: Mark [Signature]
 Quality Assurance: Control 7A MAR 30 '98
 Gnost Rep: [Signature]
 Date: 4/1/98

L 30.0dB

RL 0dBm

MKR 0dBm

57.29031GHz

10dB/

Shop Order 131615

Oper 0110

S/N F03

Date 3/27/98

AE- 26758

Para 4.213

Step 12

Eng. M. Hall

Temp. 22°C

MKR
57.29031 GHz
0 dBm

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB

RL 15.1dBm

MKR 12.77dBm

6.874840GHz

10dB/

Shop Order 431615

Oper 0110

S/N F03

Date 3/27/98

AE- 26758

Para 4.2.13

Step 12

Eng. M. Oplaw

Temp. 22°C

MKR
6.874840 GHz

12.77 dBm

W

CENTER 6.874843GHz

RBW 30kHz

VBW 30kHz

SPAN 2.000MHz

SWP 50.0ms

RL 0dBm

10dB/

56. 8606500GHz

Oper	6110
------	------

S/N 1 #03

Date 3/27/99

AE- 26758

Para 4.2.1.3

Step 15

Eng. M. Grubel

Temp. 22°C

MKR			
56.	8606500	GHZ	

-97.33 dBm

D

```
*RBW 3.0kHz *VBW 1.0kHz
```

SWP 420ms

RL O dBm

✓BPO1

57.0038760GHz

Temp. 22°C

CENTER
57.0038760 GHz

D

*RBW 3.0kHz *VBW 1.0kHz

SWP 420ms

MKR -96.00dBm

57. 1471020GHz

CENTER			
57.1471020			GHz

Shop Order 431615

Oper	0110
------	------

S/N	F03
-----	-----

Date 3/27/98

AE- 26758

Para 4.2.1.3

Step 15

Eng. M. Onda

Temp. 22°C

CENTER 57.1471020GHz

SPAN 500.0KHz

*RBW 3.0KHz

```
*VBW 1.0KHz
```

SWP 420ms

CL 30.0dB

VAVG 17

MKR -96.67dBm

RL 0dBm

10dB/

57.4335530GHz

Shop Order 431615

Oper 0110

S/N F03

Date 3/22/94

AE- 26758

Para 4.2.1.3

Step 15

Eng. M. Ojeda

Temp. 22°C

CENTER
57.4335530 GHz

CENTER 57.4335530GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

VAVG 18

MKR -96.33dBm

RL 0dBm

10dB/

57.5767790GHz

Shop Order 431615

Oper 0110

S/N F03

Date 3/27/99

AE- 26758

Param 4.2.1.3

Step 15

Eng. M. Chaudh

Temp. 22°C

CENTER
57.5767790 GHz

CENTER 57.5767790GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

VAVG 44

MKR -96.50dBm

RL 0dBm

10dB/

57.7200054GHz

D

CENTER
57.7200054 GHz

Shop Order	431615
Oper	0110
S/N	F03
Date	3/27/98
AE-	26758
Para	4.2.1.3
Step	15
Eng.	M. ddad
Temp.	22°C

CENTER 57.7200054GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

RL 0dBm

10dB/

MKR -78.83dBm

114.580667GHz

Shop Order 431615

Oper 0110

S/N R03

Date 3/27/98

AE- 26758

Para 4.2.1.3

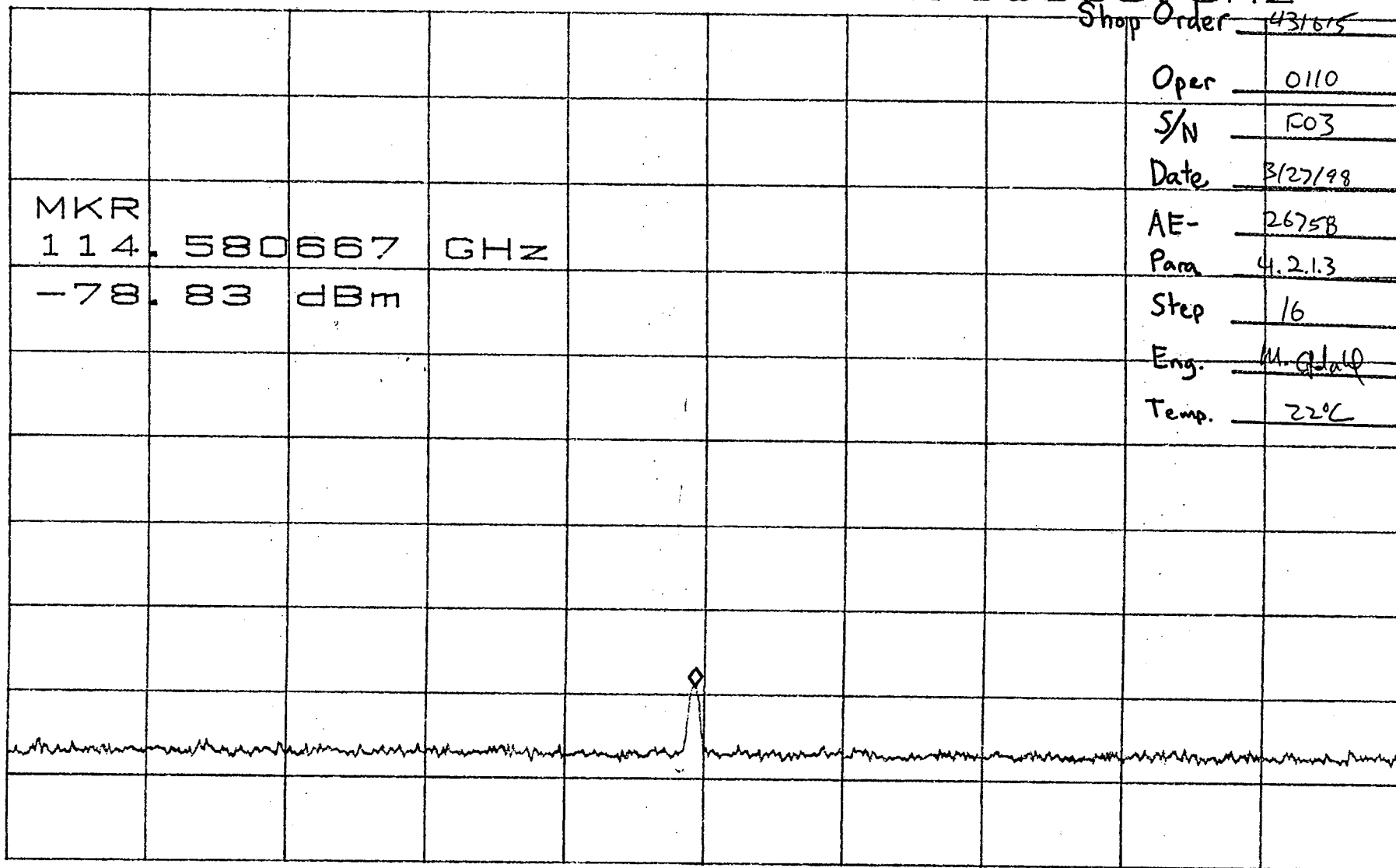
Step 16

Eng. M. G. L. Q

Temp. 22°C

MKR
114.580667 GHz
-78.83 dBm

D



CENTER 114.580700GHz

SPAN 5.000MHz

*RBW 30kHz

*VBW 1.0kHz

SWP 420ms

L 30.0dB

RL 0dBm

MKR 0dBm

57.29031GHz

10dB/

Shop Order 431615

Oper 0110

S/N F03

Date 3/28/98

AE- 26750

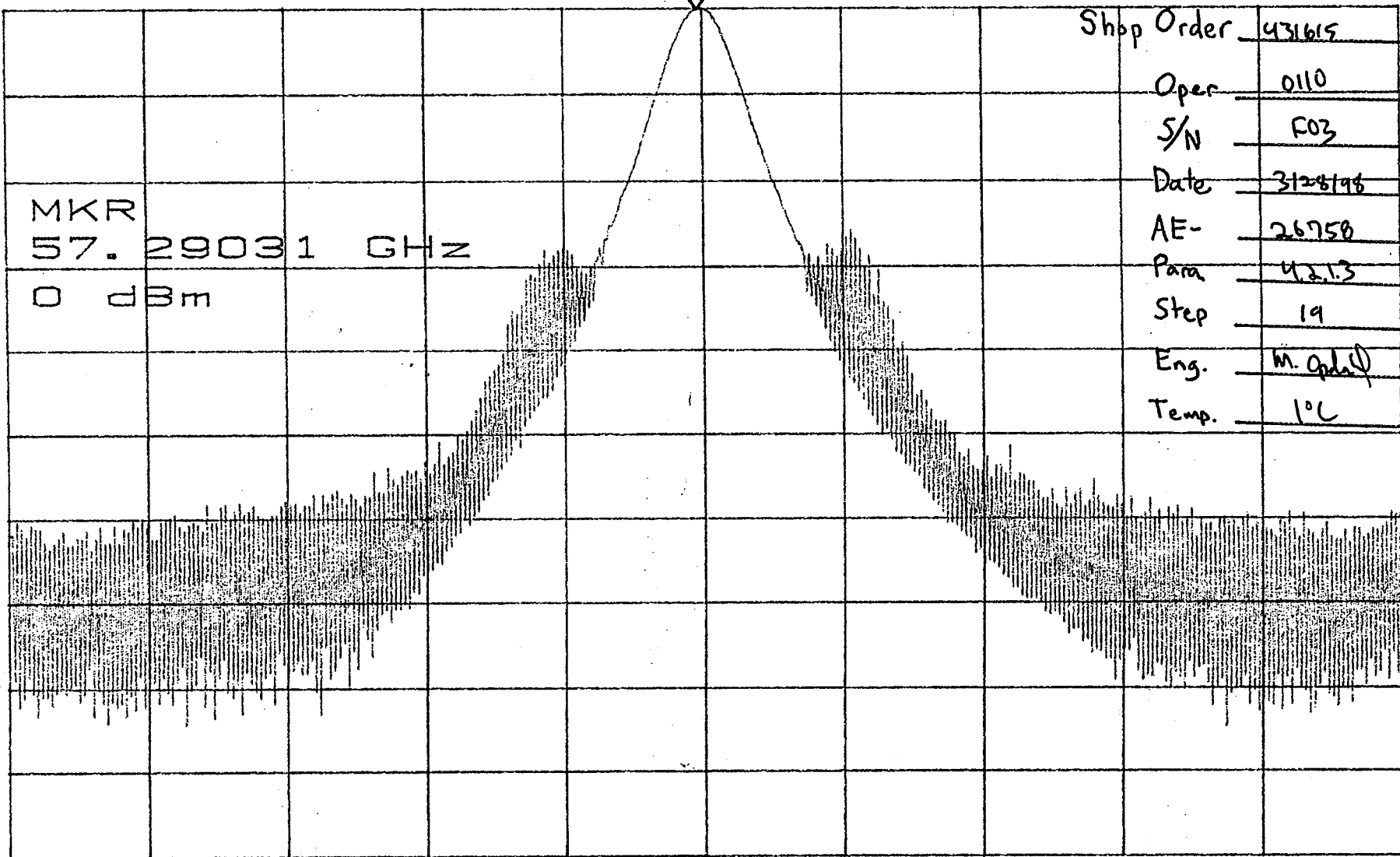
Para 42.13

Step 19

Eng. M. Ophel

Temp. 1°C

MKR
57.29031 GHz
0 dBm



CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB

RL 15.1dBm

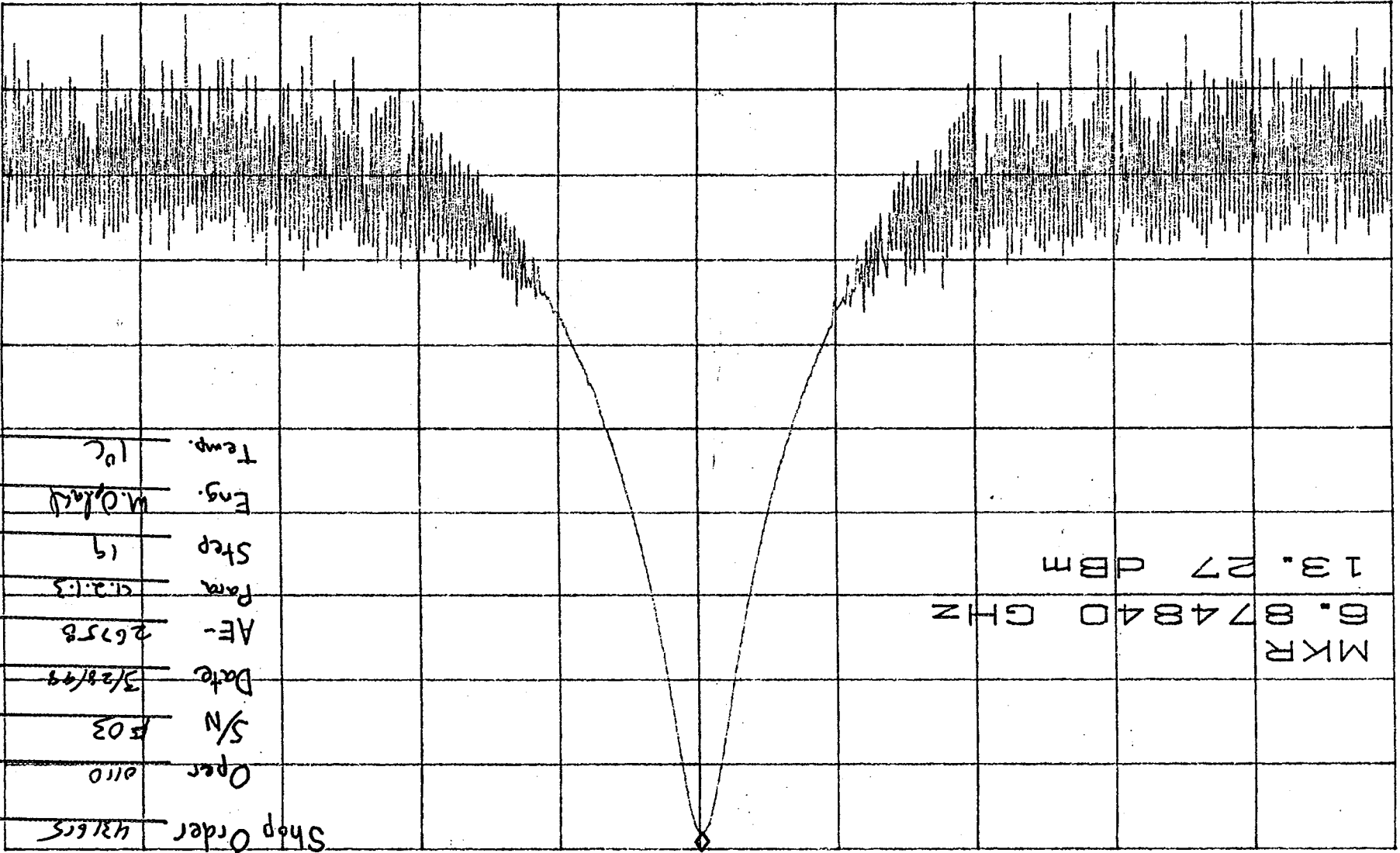
MKR 13.27dBm

6.874840GHz

MKR
6.874840 GHz

13.27 dBm

Shop Order 43165
Oper 0110
S/N 1503
Date 3/28/99
AE- 26758
Pam 4.2.1.3
Step 19
Eng. M. Q. Laid
Temp. 10°C



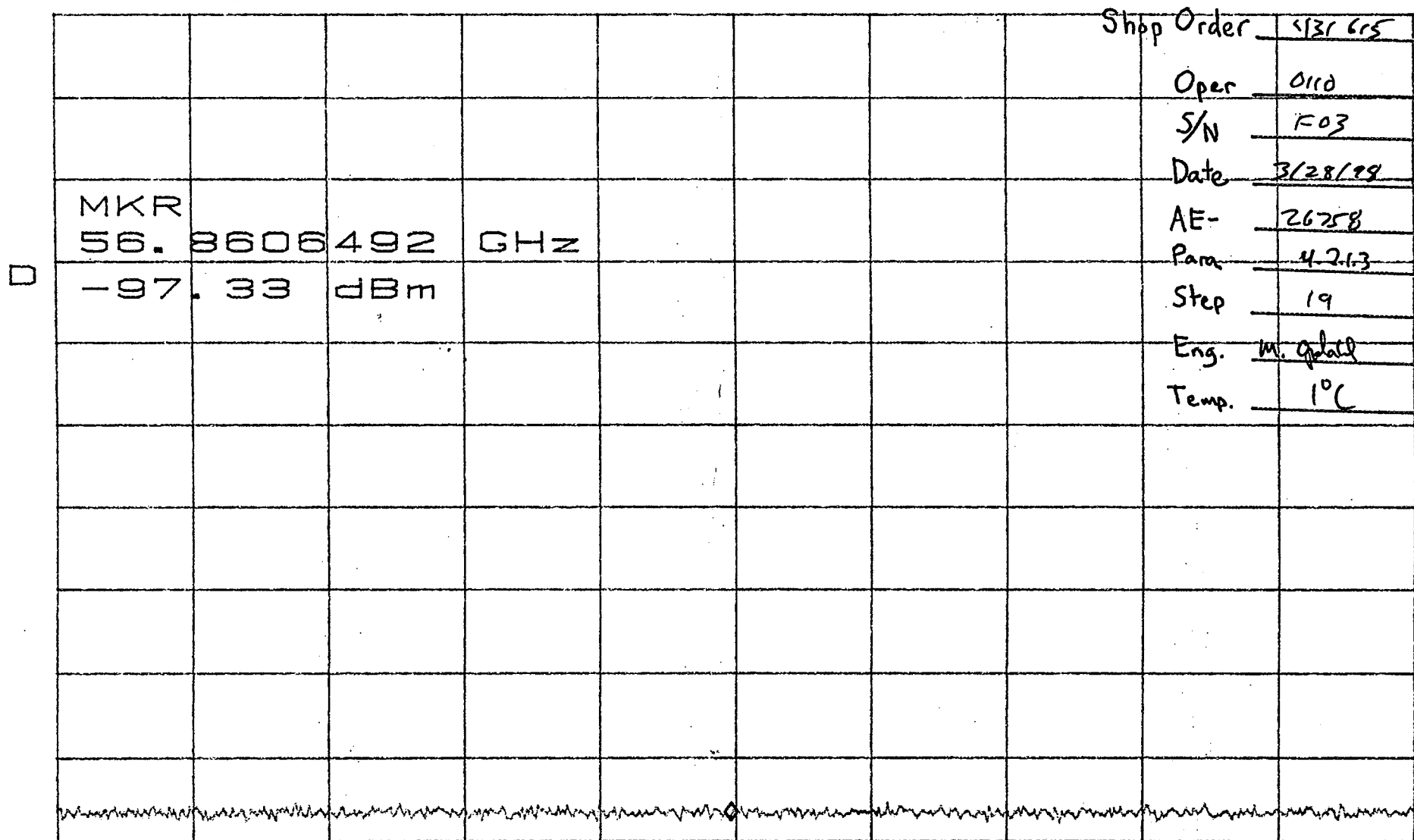
W

CENTER 6.874843GHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

CL 30.0dB
RL 0dBm

VAVG 24
10dB/

MKR -97.33dBm
56.8606492GHz



CENTER 56.8606509GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms

CL 30.0dB

VAVG 36

MKR -95.67dBm

RL 0dBm

10dB/

57.0038775GHz

D

MKR
57.0038775 GHz
-95.67 dBm

Shop Order 431615

Oper 0110

S/N F03

Date 3/20/98

AE- 26758

Para 4.21.3

Step 19

Eng. m. gela

Temp. 1°C

CENTER 57.0038767GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

VAVG 38

MKR -96.33dBm

RL 0dBm

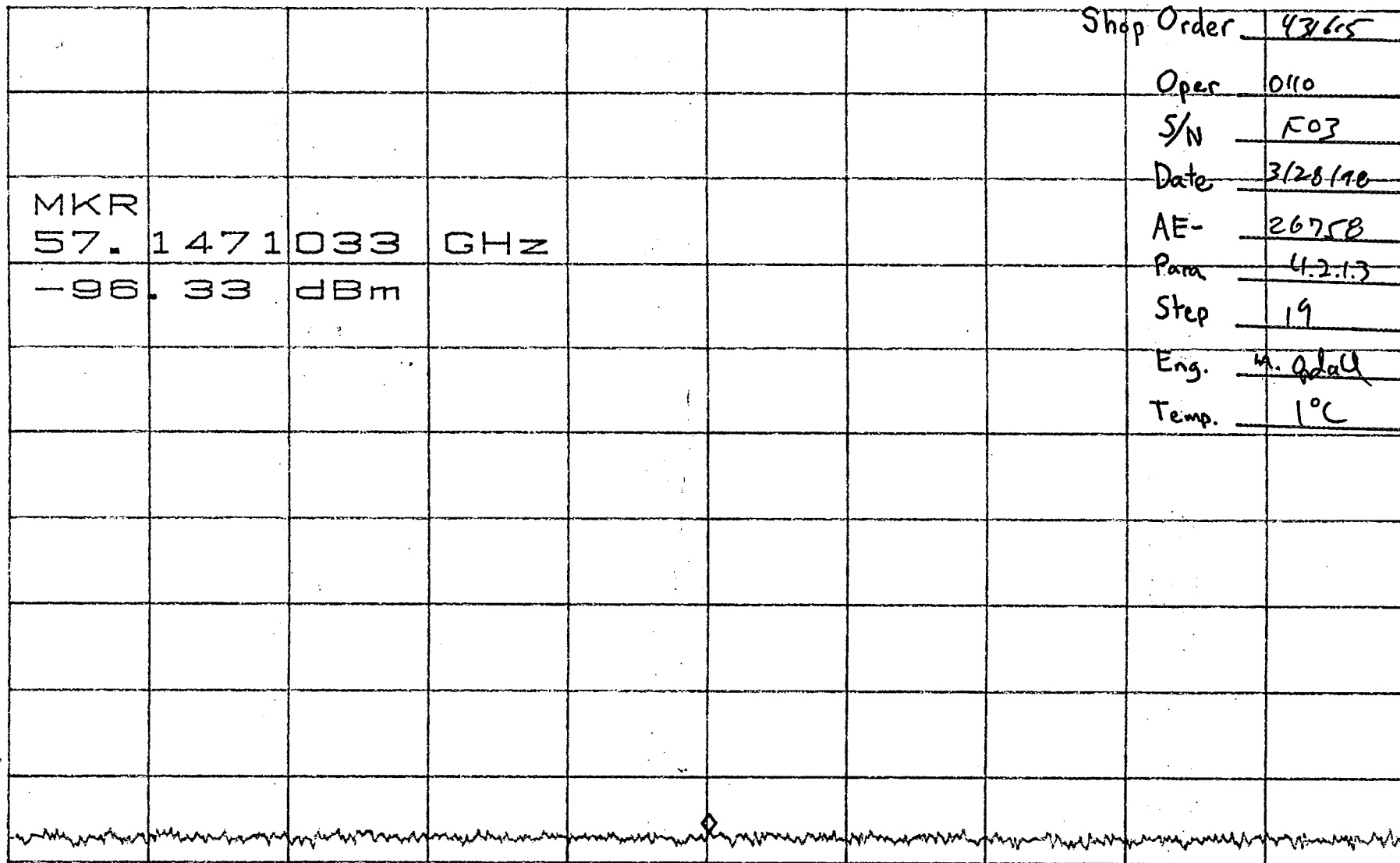
10dB/

57.1471033GHz

Shop Order	4365
Oper	0110
S/N	F03
Date	3/28/98
AE-	267.58
Para	4.2.1.3
Step	19
Eng.	M. Gdall
Temp.	1°C

MKR
57.1471033 GHz
-96.33 dBm

D



CENTER 57.1471025GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

VAVG 100

MKR -96.17dBm

RL 0dBm

10dB/

57.4335498GHz

Shop Order 43165

Oper 0110

S/N F03

Date 3/28/99

AE- 26758

Para 4213

Step 19

Eng. M. G. G.

Temp. 1°C

MKR
57.4335498 GHz

-96.17 dBm

CENTER 57.4335540GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 1.0KHz

SWP 420ms

CL 30.0dB
RL 0dBm

VAVG 45
10dB/

MKR -97.00dBm
57.5767808GHz

Shop Order 43/615

Oper OLW

S/N R03

Date 3/28/14

AE- 26758

Para 4.2.1.3

Step 19

Eng. M. J. J. J.

Temp. 1°C

MKR
57.5767808 GHz
-97.00 dBm

CENTER 57.5767800GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

MKR -97.00dBm

57.7200066GHz

D

CENTER 57.7200058GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms

L 30.0dB

RL 0dBm

10dB/

MKR -76.00dBm

114.580675GHz

Shop Order 431615

Oper 0110

S/N 503

Date 3/28/98

AE- 20758

Para 4213

Step 19

Eng. M. G. L. L.

Temp. 1°C

MKR
114.580675 GHz

-76.00 dBm



CENTER 114.580700GHz

SPAN 5.000MHz

*RBW 100kHz

*VBW 1.0kHz

SWP 130ms

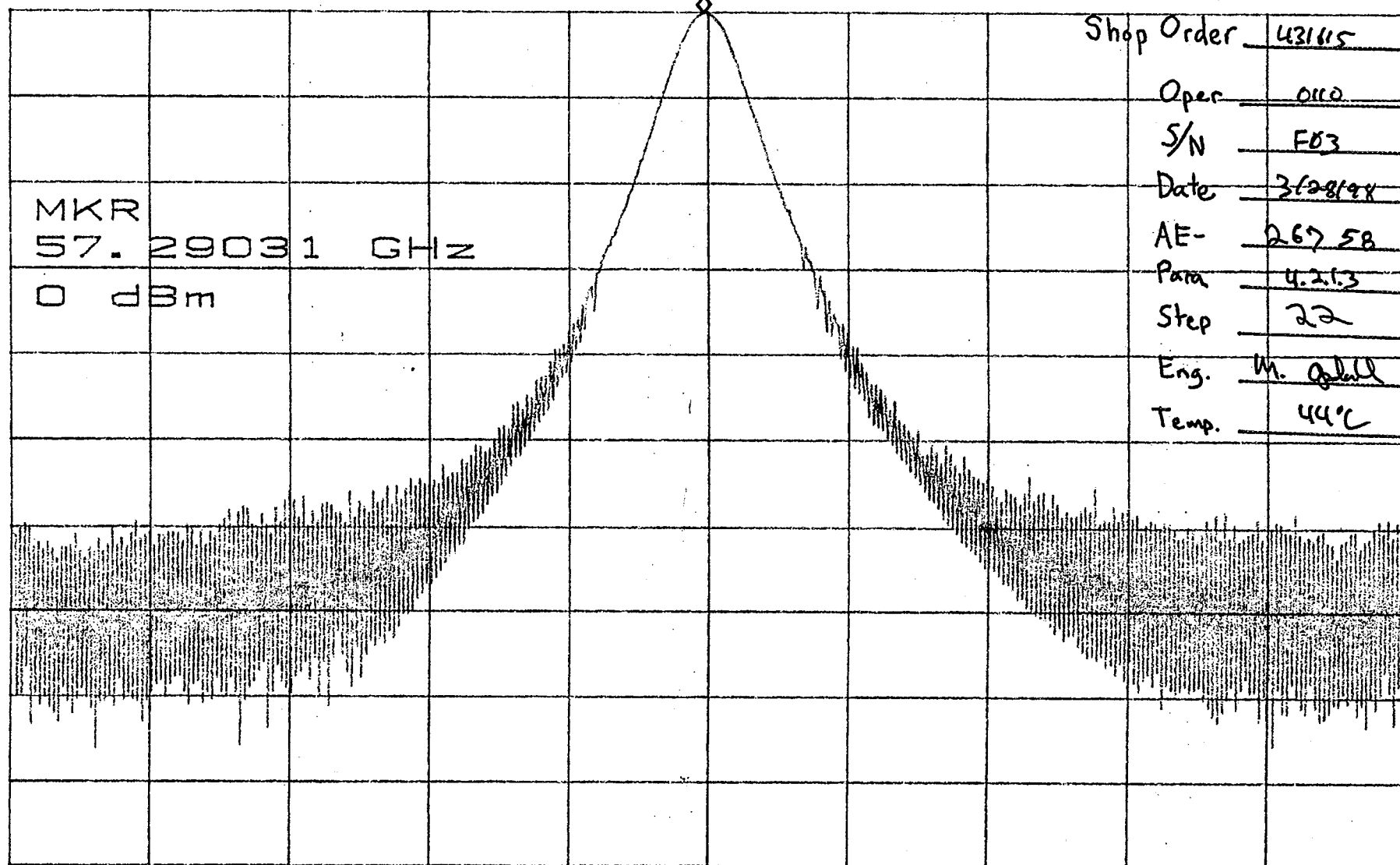
L 30.0dB

MKR 0dBm

RL 0dBm

10dB/

57.29031GHz



Shop Order 431615

Oper 0110

S/N F03

Date 3/28/98

AE- 267.58

Para 4.213

Step 22

Eng. M. G. Hall

Temp. 44°C

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB

RL 15.1dBm

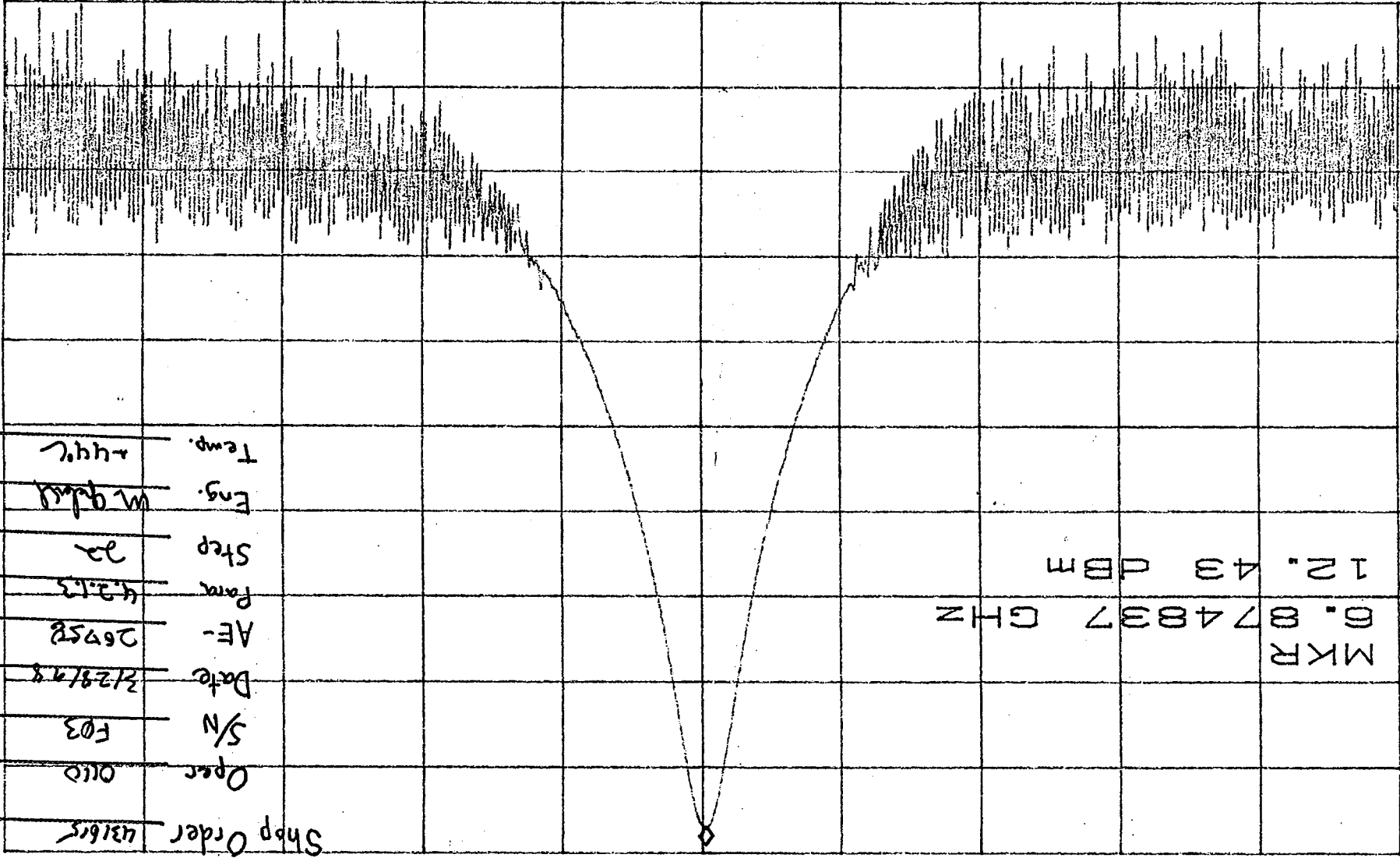
MKR 12.43dBm

6.874837GHz

MKR 6.874837 GHz

12.43 dBm

Shop Order	431615
Oper	OK
S/N	F03
Date	2/28/98
AE	26758
Part	4.2.13
Step	22
Eng.	M. J. J.
Temp.	+44°C



CENTER 6.874843GHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

W

CL 30.0dB
RL 0dBm

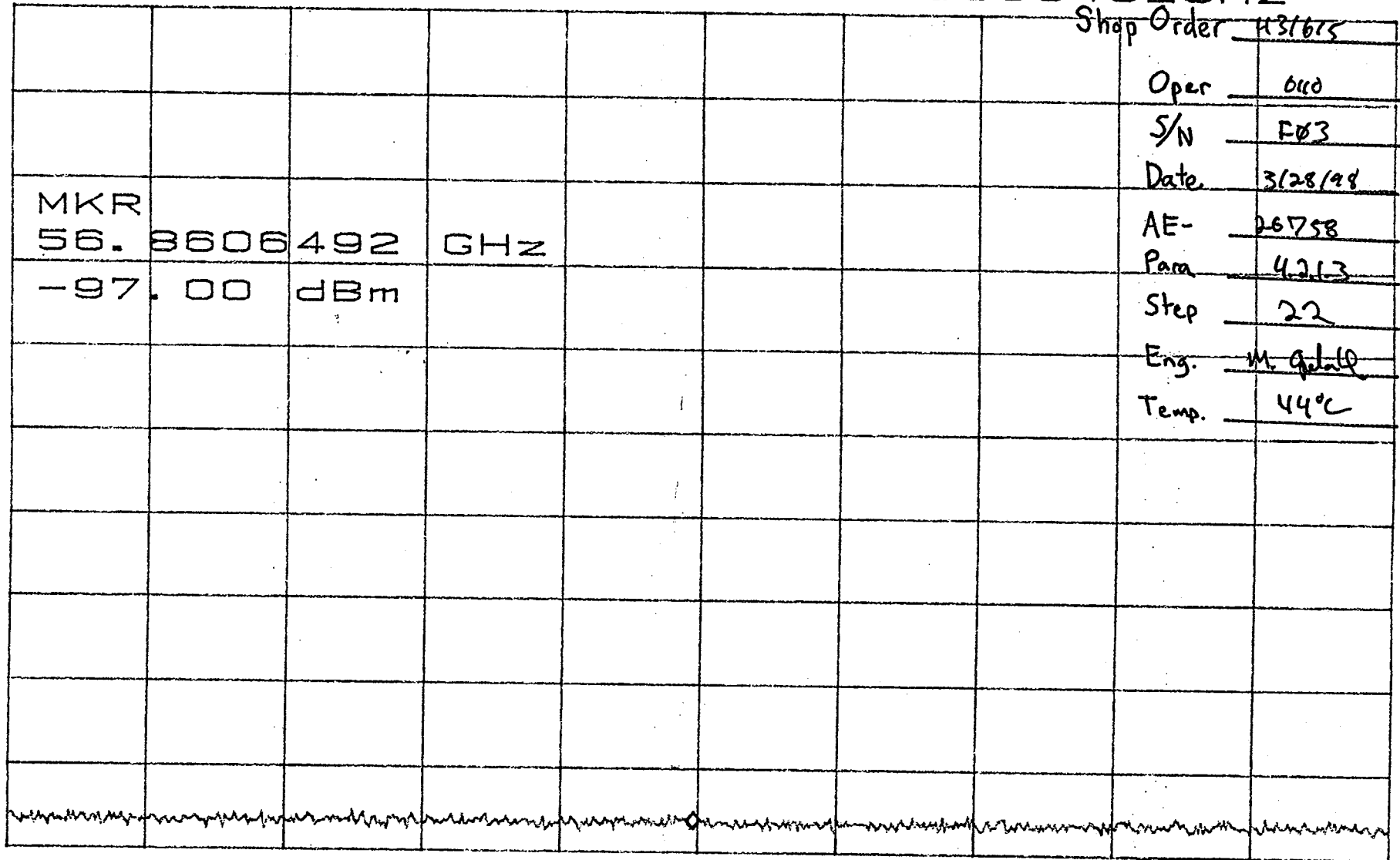
VAVG 42
10dB/

MKR -97.00dBm
56.8606492GHz

Shop Order 1131675
Oper 6110
S/N F03
Date 3/28/98
AE- 26758
Param 4.2.13
Step 22
Eng. M. G. L. L.
Temp. 44°C

MKR
56.8606492 GHz
-97.00 dBm

D



CENTER 56.8606509GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms

CL 30.0dB
RL 0dBm

VAVG 15
10dB/

MKR -96.17dBm
57.0038750GHz

Shop Order 431615

Oper 0110

S/N F03

Date 3/28/94

AE- 26958

Pam 4.213

Step 22

Eng. M. Oplatt

Temp. 44°C

D MKR
57.0038750 GHz
-96.17 dBm

CENTER 57.0038767GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

RL 0dBm

10dB/

57. 1471008GHz

Shop Order 431615

Oper	0110
------	------

S/N F03

Date 3/28/94

AE- 26758

Para 4.2.1.2

Step 22

Eng. M. Gschult

Temp. 44°

MKR			
57.	1 47 1	008	GHz
-97.	50	dBm	

D

CENTER 57.1471025GHz

```
*RBW 3.0kHz
```

```
*VBW 1.0kHz
```

SPAN 500.0KHz

SWP 420ms

CL 30.0dB

VAVG 40

MKR -96.00dBm

RL 0dBm

10dB/

57.4335515GHz

Shop Order 43165

Oper 0110

S/N F03

Date 3/28/98

AE- 26758

Para 4.213

Step 22

Eng. M. D. L.

Temp. 44°C

MKR
57.4335515 GHz

-96.00 dBm

CENTER 57.4335540GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

MKR -95.83dBm

57. 5767775GHz

Temp. 44°C

SPAN 500.0KHz

SWP 420ms

CL 30.0dB

VAVG 14

MKR -95.50dBm

RL 0dBm

10dB/

57.7200033GHz

D

MKR
57.7200033 GHz
-95.50 dBm

Shop Order 431615

Oper 010

S/N F03

Date 3/28/98

AE- 26758

Para 42.13

Step 22

Eng. M. G. Hall

Temp. 44°C

CENTER 57.7200058GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

L 30.0dB

RL 0dBm

10dB/

MKR -75.17dBm

114.580650GHz

Shop Order 431675

Oper 0110

S/N 1783

Date 3/08/96

AE- 26758

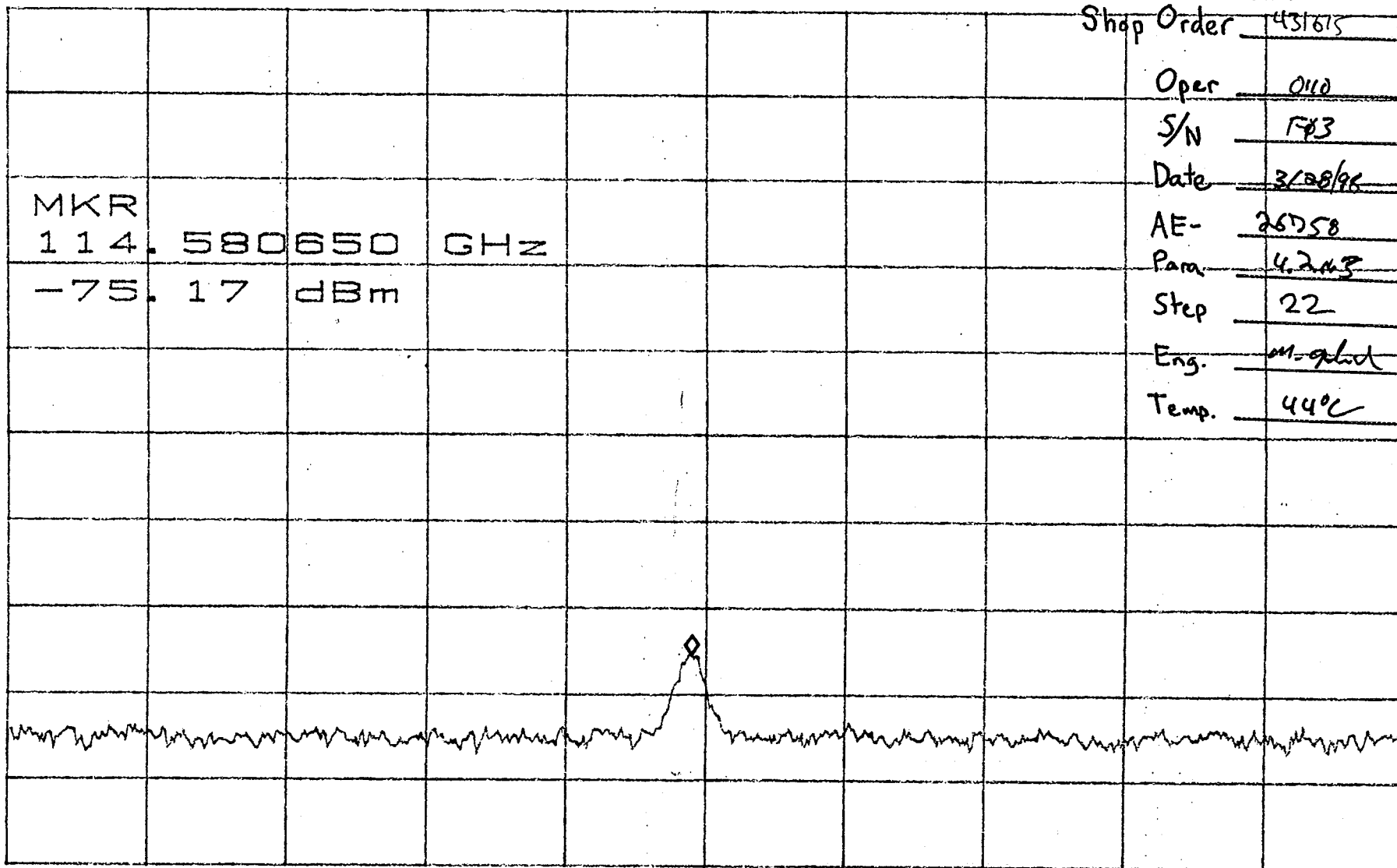
Param 4.2m3

Step 22

Eng. m-ghd

Temp. 44°C

MKR
114.580650 GHz
-75.17 dBm



CENTER 114.580700GHz

SPAN 5.000MHz

*RBW 100kHz

*VBW 1.0kHz

SWP 130ms

Section 1B: Initial Functional Testing - F04

This section contains the results of a full functional test over temperature and under vacuum, taken before the PLO (F04) endured 6 thermal cycles.

GENCC

AEROJET, AZUSA OPERATIONS

Azusa, California

CAGE Code 70143

ENGINEERING CHANGE NO. 1000

ADVANCE REL.

INCORPORATE

SHEET 1 OF 34

AEROJET

1. PROGRAM COMBINED AMSU	2. ECN NUMBER CAMSU- 1675	3. CONTRACT NUMBER NAS 5-32314	4. PREPARED BY / DATE / EXT MARK O'BRIEN / 1.28.98 / 1305	5. DOCUMENT NUMBER AE-26758A	6. NEW REV. B
7. CHANGE CLASS IA IB <u>IP</u>	8. MULTIPLE DOCUMENTS AFFECTED YES <u>NO</u>	9. CHG TYPE <u>DOC CHG</u> HARDWARE SOFTWARE	10. HARDWARE CURR REV NEW REV PART NUMBER(S) MAND LTST MAND LTST N/A	11. DOCUMENT TITLE Phase Lock Oscillator (PLO) Assembly; Assembly Procedure, Tuning Procedure, and performance test procedure AMSU	
CCR #			EFFECTIVITY <input checked="" type="checkbox"/> END ITEM S/N <input type="checkbox"/> PART SERIAL/LOT 105dup		

12. DESCRIPTION OF CHANGE
ITEM ZONE

See Attached Redlined Spec Data Sheets

401

Urgent ☐ Routine ☒

13. SIGNATURES	DATE	14. JUSTIFICATION / REASON FOR CHANGE Increased Test Data Sheet Readability	15. DISPOSITION OF MATERIAL	USE AS IS	MODIFY	SCRAP	RETURN TO STORES
Design Verif., Dwg. N.A. OP			ON ORDER	—	N/A	—	
Qual Eng Chad H. H. H. H.	2/12/98		IN STOCK	—	N/A	—	
PTL (Eng) D. H. H. H.	2/12/98		INSTALLED	—	N/A	—	
Mfg Eng D. H. H. H.	2/16/98	16. REMARKS/SPECIAL INSTRUCTIONS/TECHNICAL EVALUATION No Process changes and no technical impact	20. CONFIGURATION MGR. D. H. H. H.				
Sysr Eng D. H. H. H.	2/16/98		21. DIST. CODE:		22. REL. DATE		
		17. NASA CONCURRENCE OF CLASSIFICATIONS	18. CHANGE CODE A/O/I	19. PCCB CHAIRMAN / PMO: APPROVE DISAPPROVE DEFER	23. INCORPORATION DATE		
					Inc. By Design Verif.		

AE-26758A
21 Jan 98

SHEET 2 OF 34
RCP NO. 1675

TEST DATA SHEET 1

Equipment Calibration (Paragraph 4.2.1.1)

~~STBT~~
Test Setup Verified:

Signature

Item	Description	Manufacturer	Model/Part Number	Calibration	Property Number
1					
2					
3					
4					
5					
6		See GU Test Setups			
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Shop Order No.: 431618
operation: 0040
Unit Serial No.: 1-04
Date: 3-6-98

Test Engineer: Mark [Signature]
Quality Assurance: (7A) 190 MAR 06 1998
Govt. Rep.

SHEET 3 OF 34
 WFP NO. 1675

AE-26758A
 21 Jan 98

TEST DATA SHEET 2
 UUT Verification and Ground Potentials Check (Paragraphs 4.1.2.2 and 4.1.2.4)

Test Setup Verified: NET

Signature

Paragraph/ Step	UUT Components	Part Number	Verify Presence	
4.1.2.2.	PLO faceplate	1348366-2	✓	
	VCGDO	1348351-1	✓	
	DRO	1348400-1	✓	
	Cable	1357793-4	✓	
	Filter	1357729-1	✓	
	Cable	1348430-1	✓	
	Cable	1348430-2	✓	
	Cable	1348430-3	✓	
	Wires	N/A	✓	
	Connector/Waveguide Savers Installed?		✓	

Paragraph/ Step	Test		Required	Measurement	Pass/ Fail
4.1.2.4 Step 1	Potential Difference				
	From	To	Required	Measurement	
	GUNN Power Supply RTN	Varactor Power Supply RTN	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	DRO Power Supply RTN, +12 V	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	DRO Power Supply RTN, -12 V	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 1, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 2, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Spectrum Analyzer 3, Chassis	< 1.0 Vac	0.01	Pass
	GUNN Power Supply RTN	Synthesized Sweeper Chassis	< 1.0 Vac	0.01	Pass

Shop Order No.: 431618
 Operation: 0040
 Unit Serial No.: F04
 Date: 3-6-98

Test Engineer: [Signature]
 Quality Assurance: CONFIDENTIAL
 GDDT, REP



MAR 06 1998

TEST DATA SHEET 3 (Sheet 1 of 2)
Attenuator Determination (Paragraph 4:1.2.4)

Paragraph 4.1.2.4:

Step	Test	Expected	Measured	Pass/ Fail
5	Recommended LO Power	8 to 11.8 dBm	Recommended Mixer LO Drive Power $P_{opt} = \underline{\quad 11 \quad}$ dBm	N/A
6	Initial Attenuator Setting	<u>N/A</u>	AT1 = (DRO Output Power at A6-J1) - (Bandpass Filter Insertion Loss) - $P_{opt} =$ <u>3</u> dB	N/A
	Which dash number attenuator was chosen?	-1 to -11	AT1 Selected 1331516- <u>6</u>	N/A
13	+12 V Supply Voltage	$+12.0 \pm 0.1$ V	$V^+ = \underline{12.0}$ V	Pass
	+12 V Supply Current	< 75 mA	$I^+ = \underline{40.5}$ mA	
	-12 V Supply Voltage	-12.0 ± 0.1 V	$V^- = \underline{-12.0}$ V	
	-12 V Supply Current	< 90 mA	$I^- = \underline{-54.7}$ mA	
14	DRO Output Frequency and Power at A1-J4	<u>6.874841 GHz</u> <u>± 24 kHz</u> 11 to 15 dBm	Freq _{DRO} = <u>6.87485</u> GHz $P_{DRO} = \underline{11.5}$ dBm	Pass
15	Gunn Voltage	$+8.5 \pm 0.1$ V	$V_{gunn} = \underline{8.5}$ V	Pass
	Gunn Current	< 340 mA	$I_{gunn} = \underline{296}$ mA	
	Varactor Supply Voltage	5.0 ± 0.1 V	$V_{var} = \underline{5.0}$ V	
	Varactor Supply Current	< 5 mA	$I_{var} = \underline{0.1}$ mA	
16	PLO Output Frequency and Power	N/A 17 to 20 dBm	Freq _{PLO} = <u>57.333</u> GHz $P_{PLO} = \underline{20}$ dBm	N/A Pass
18	Record IF Frequency and Power	2.291613 ± 0.0001 GHz N/A	IF Frequency = <u>2.29161</u> IF Power = <u>-36.8</u>	N/A
20	Record IF Frequency and Power	2.291613 ± 0.0001 GHz -30 to -40 dBm	IF Frequency = <u>2.29161</u> IF Power = <u>-36.8</u>	Pass

~~6.874817 to 6.874865 GHz~~
6.874841 \pm .000024 GHz

74
190 MAR 06 1998

SHEET 5 of 34
 0040 NO. 1675

AE-26758A
 21 Jan 98

TEST DATA SHEET 3 (Sheet 2 of 2)
 Attenuator Determination (Paragraph 4.1.2.4)

Paragraph 4.1.2.4 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
21	LO Power Level	8.0 to 12.0 dBm	LO Drive Power <u>10.4</u>	Pass
22	Record AT1 dash number	<u>N/A</u>	1331516- <u>6</u>	N/A
32	Record IF Frequency and Power	2.291613 \pm 0.0001 GHz	IF Frequency = <u>2.29161</u>	Pass
		-30 to -40 dBm	IF Power = <u>-37.1</u>	Pass
34	DRO Lock Alarm with 573 MHz Signal Off	1V 10V	A1-FL6 = <u>-11.6</u> V	Pass

< -10 Volts

Shop Order No.: 4131618
 operation: 0040
 Unit Serial No.: F061
 Date: 3-6-98

Test Engineer: [Signature]
 Quality Assurance: CONTROL
 GOVT. REP. [Stamp]
 74 190 MAR 06 1998

AE-26758A
21 Jan 98

SHEET 6 OF 34
ROR NO. 1675

TEST DATA SHEET 4
Voltage Regulator Continuity Test (Paragraph 4.1.3)


Test Setup Verified: GTBT

Signature

Paragraph 4.1.3.3, Continuity Test:

Step	From end of wire #	From end of wire #	Expected Value	Measured Value	Pass/Fail
2	A4E5	R1-2	< 1 ohm	0.1	Pass
	A4E1	R1-1	< 1 ohm	0.1	Pass

Shop Order No.: 431618
operation: 0000
Unit Serial No.: F04
Date: 3-6-98

Test Engineer: Mark Rhoad
Quality Assurance: Control
Govt. Rep.  MAR 06 1998

TEST DATA SHEET 5 (Sheet 1 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Test Setup Verified: STB

Signature

Paragraph 4.1.4.1.2:

UUT Components	Part Number	Verify Presence
PLO Housing Assembly	1348366-1	✓
Voltage Regulator	1357979	✓
R1 (Resistor)	RER60F10R0R	✓
Wires	N/A	✓

m. qtd
3-7-98

Paragraph 4.1.4.1.4:

Step	From	To	Wire Color	Expected	Measured	Pass/Fail
3	Continuity Checkout					
a.	A1FL1	A4E1	Red	< 1 ohm	0.1	Pass
	A1FL2	A4E3	Blk	< 1 ohm	0.2	Pass
	A1FL3	A4E7	Brn	< 1 ohm	0.1	Pass
	A1FL4	A4E2	Blu	< 1 ohm	0.1	Pass
	A1FL5	A4E4	Yel	< 1 ohm	0.1	Pass
	A1FL7	A4E9	Gm	< 1 ohm	0.2	Pass
b.	A4E6	A5VB	Gra	< 1 ohm	0.1	Pass
	A4E10	A5RTN	Gm	< 1 ohm	0.2	Pass
	A4E2	A6FL1	Blu	< 1 ohm	0.3	Pass
	A4E4	A6FL2	Yel	< 1 ohm	0.3	Pass
	A4E8	A6FL1-E3	Gm	< 1 ohm	0.4	Pass
	A1FL6	A6FL3	Wht	< 1 ohm	0.1	Pass
	A1J2	A5VT	Wht	Visual Verification No Measurement	N/A Present	Pass

m. qtd
3-7-98

Step	Test	Expected Value	Measured Value	Pass/Fail
5	Measure voltage levels	+12.0 ± 0.5 V	A1-FL4 <u>12.13</u> V	Pass
		-12.0 ± 0.5 V	A1-FL5 <u>-11.93</u> V	Pass
		8.5 ± 0.5 V	A5VB <u>8.51</u> V	Pass
		+12.0 ± 0.5 V	A6FL1 <u>+12.1</u> V	Pass
		-12.0 ± 0.5 V	A6FL2 <u>-11.92</u> V	Pass

m. qtd
3-7-98

74 190 MAR 07 1998

m. qtd 3-7-98

TEST DATA SHEET 5 (Sheet 2 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.1.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
7	Continuity Test Wire #			
	9	< 1.0 ohm	0.1	Pass
	10	< 1.0 ohm	0.3	Pass
	11	< 1.0 ohm	0.2	Pass
	12	< 1.0 ohm	0.2	Pass
	13	< 1.0 ohm	0.3	Pass
	14	< 1.0 ohm	0.2	Pass
9	Measure Supply Voltages and Currents			
	Volt Meter 1	+15 ± 0.1 V	15.0	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0	Pass
	Current Meter 1	600 mA max	358	Pass
	Current Meter 2	100 mA max	-56	Pass
	Faceplate A1FL4	+12.0 ± 0.5 V	12.1	Pass
	Faceplate A1FL5	-12.0 ± 0.5 V	-11.9	Pass
	DRO, A6FL1	+12.0 ± 0.5 V	12.1	Pass
	DRO, A6FL2	-12.0 ± 0.5 V	-11.9	Pass
	VCGDO, A5VB	+8.5 ± 0.5 V	8.5	Pass

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MAR 07 1998

M. G. G. G.
3-7-98

Paragraph 4.1.4.2.2:

UUT Components	Part Number	Verify Presence
UUT from Paragraph 4.1.4.1.2	N/A	✓
PLL/TCXO Assembly	1358332-1	✓
Cable Assembly	1348435-1	✓

Paragraph 4.1.4.2.4:

Step	Test	Expected Value	Measured Value	Pass/Fail
1	Potential Difference From +15 V RTN To:			
	Spectrum Analyzer Chassis	< 1.0 Vac	0.001 VAC	Pass
	Oscilloscope RTN	< 1.0 Vac	0.001 VAC	Pass

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MAR 17 98

TEST DATA SHEET 5 (Sheet 3 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
3	Continuity Test			
	A1FL4 to A3FL2	< 1.0 ohm	0.1	Pass
	A1FL5 to A3FL3	< 1.0 ohm	0.1	Pass
	A1FL4 to A3FL1	< 1.0 ohm	0.1	Pass
	A3FL1 to A2FL1	< 1.0 ohm	0.2	Pass
6	Voltage Measurement			
	A3FL2	+12.0 ± 0.5 V	12.1	Pass
	A3FL3	-12.0 ± 0.5 V	-11.9	Pass
7	Repetition Rate	8 - 12 msec	8.9 msec	Pass
	Rise Time	0.9 - 3.5 msec	3.25 msec	Pass
	Fall Time	25 usec - 2 msec	.75 msec	Pass
8	Output Power	1 - 4 dBm	3.6 dBm	Pass
	Output Frequency	572.90344 ± 0.003 MHz	572.9043 MHz	Pass
16	Volt Meter 1	+15 ± 0.1 V	15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	531 mA	Pass
	Current Meter 2	100 mA max	57.8 mA	Pass
	PLO Lock Detect Voltage at A3FL4	< 1V 0 to 1 V	54 mV	Pass
17	RF Output Frequency	57.290344 GHz ± 200 kHz 57.290344 GHz ± 200 kHz	57.290331 GHz 57.290331 GHz	Pass
	RF Output Power	17 to 20 dBm	17.2 dBm 17.2 dBm	Pass
18	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz 6.874841280 GHz ± 24 kHz 0.00024 GHz	6.87484 GHz 6.87484 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	11.2 dBm	Pass
19	Did PLO acquire the Lock?	Yes	Yes	Pass

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TEST DATA SHEET 5 (Sheet 4 of 5)
Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4 (Cont):

Step	Test	Expected Value	Measured Value	Pass/Fail
23	Test with 3 dB attenuation in IF line (2.2 GHz) at room ambient			
	Volt Meter 1	+15 ± 0.1 V	15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	532 mA	Pass
	Current Meter 2	100 mA max	-57.9 mA	Pass
	PLO Lock Detect Voltage at A3FL4	< 1V 0 to 1 V	47 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290330 GHz	Pass
	RF Output Power	17 to 20 dBm	19.3 dBm m. update 3.24.98	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .000024 GHz	6.87484 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	11.2 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass
24	Test with 3 dB attenuation in IF line (2.2 GHz) at +1°C			
	Volt Meter 1	+15 ± 0.1 V	15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	518 mA	Pass
	Current Meter 2	100 mA max	55.5	Pass
	PLO Lock Detect Voltage at A3FL4	< 1V 0 to 1 V	53 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290323231 GHz	Pass
	RF Output Power	17 to 20 dBm	20.0 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .000024 GHz	6.87485 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	11.4 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass

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SHEET 11 of 34
 REC NO. 1675

AE-26758A
 21 Jan 98

TEST DATA SHEET 5 (Sheet 5 of 5)
 Voltage Regulator Checkout, PLO Integration (Paragraph 4.1.4)

Paragraph 4.1.4.2.4:

Step	Test	Expected Value	Measured Value	Pass/Fail
24	Test with 3 dB attenuation in IF line (2.2 GHz) at +44°C			
(Cont)	Volt Meter 1	+15 ± 0.1 V	15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	541 mA	Pass
	Current Meter 2	100 mA max	59.4 mA	Pass
	PLO Lock Detect Voltage at A3FL4	<1V 0 to 1 V	87 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290325726 GHz	Pass
	RF Output Power	17 to 20 dBm	18.2 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .000024 GHz	6.874860 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	10.9 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass
26	Test with no attenuation in IF line (2.2 GHz) at room ambient			
	Volt Meter 1	+15 ± 0.1 V	+15.0 V	Pass
	Volt Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max	533 mA	Pass
	Current Meter 2	100 mA max	-57.7 mA	Pass
	PLO Lock Detect Voltage at A3FL4	<1V 0 to 1 V	58 mV	Pass
	RF Output Frequency	57.290344 GHz ± 200 kHz .00024 GHz	57.290330 GHz	Pass
	RF Output Power	17 to 20 dBm	17.3 dBm	Pass
	DRO Output Frequency at A1J4	6.874841280 GHz ± 24 kHz .000024 GHz	6.87484 GHz	Pass
	DRO Output Power at A1J4	9 dBm min	11.2 dBm	Pass
	Did PLO acquire the Lock?	Yes	Yes	Pass

Shop Order No.: 431618

Unit Serial No.: F04

Date: 3-24-98

Test Engineer: Mark Deland

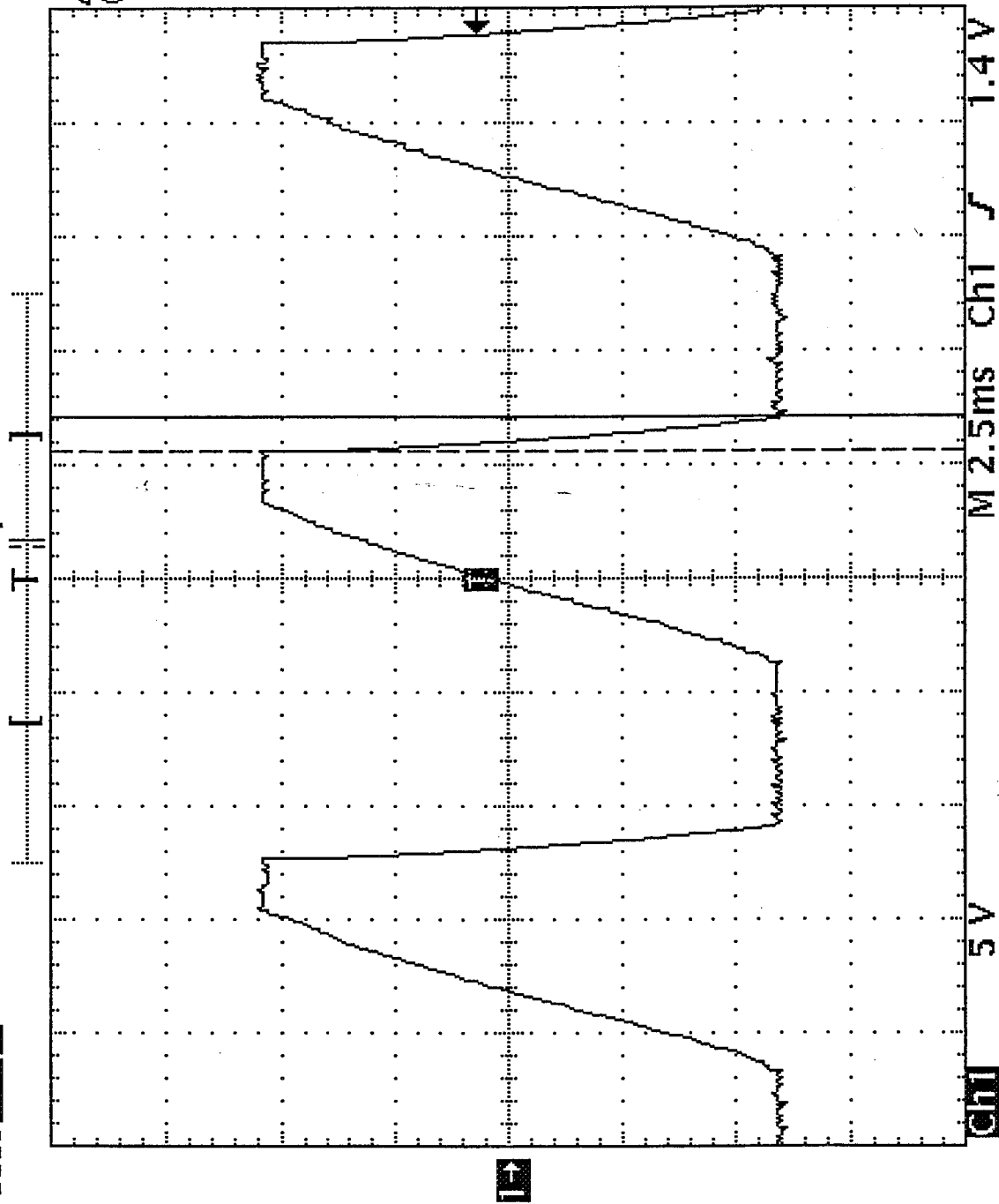
Quality Assurance: Control

Govt. AEP.



AE-26758A (ECN) Pw 142.4 step 7
3.12.94 M. Q. L. J.

Tek STOP 20KS/s 2249 Acqs



Δ : 750 μ s
@: 3.55ms

Ch1 Freq
111.5 Hz

Ch1 +Duty
36.1%

Ch1 RMS
9.776 V

Ch1 Mean
-3.877 V

12 Mar 1998
16:19:10

ATTEN 30 DB
RL 10.7 DB

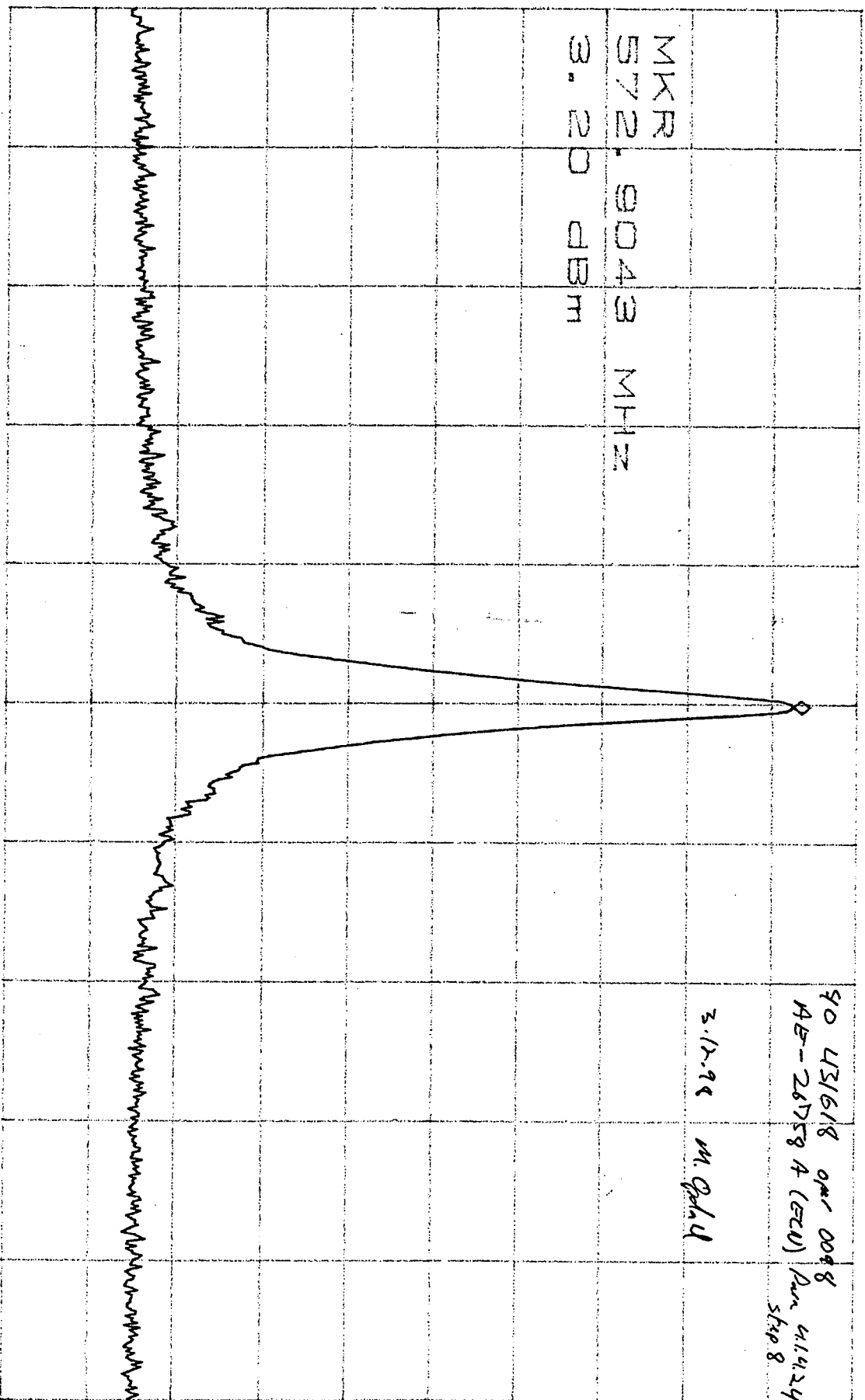
10 DB/

MKR 3.20 DB
572.0043 MHz

90 431618 01/0048
AE-267594 (EU) Run 4.14.24
Step 8

3.12.94 M. Gd. 11

MKR
572.0043 MHz
3.20 DB



CENTER 572.0043 MHz SPAN 500.0 kHz
* RBW 3.0 kHz * VBW 3.0 kHz SWP 140 MHz

TEST DATA SHEET 1
(Paragraph 4.1 Step 1 & 2)

SHOP ORDER NO.: 431618

DATE: 3.12.98

UNIT PART NO. 1344360-1

TEST

ENGINEER: M. J. [Signature]

SPD S/N: 30

QUALITY
ASSURANCE: R. [Signature]



MAR 17 98

ITEM	DESCRIPTION	MANUFACTURER	MODEL/PART NUMBER	CALIBRATION DUE DATE	PROPERTY NUMBER
	Power Supply	HP	6227B	4 Oct 97	49010
	Power Supply	HP	6114A	30 Jun 97	49791
	DUM	HP	3478A	21 May 96	45771
	DUM	HP	3478A	29 Aug 98	49871
	DUM	HP	3478A	24 Jun 98	47351
	DUM	HP	3442A	20 Feb 97	L-50931
	DUM	HP	3478A	19 Jun 98	47356
	DUM	HP	3478A	21 Nov 98	416915
	O scope	Tek	TD5380	1-20-97	C0026093
	Decade Box	Omni Supply	DB 877	7-15-97	47768
	Attenuator	TRG	V-Band	7-26-98	L-800849
	Analyzer	HP	4563E	5-22-98	C0020095
	Power Meter	Anritsu	ML83A	12-8-97	L-508915
	Power Sensor	Anritsu	MP716A	12-8-98	54202
	Plotter	HP	7470 A	Not req'd	49222

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TEST DATA SHEET 2

(Paragraph 4.1 Step 4)

TEST From +12v Power Supply RTN To	MEASURED	REQUIRED	PASS/FAIL
8566B Spectrum Analyzer Chassis	.01	< 0.1v	Pass
DVM #1 Common	.01	< 0.1v	Pass
DVM #2 Common	.01	< 0.1v	Pass
DVM #3 Common	.01	< 0.1v	Pass
DVM #4 Common	.01	< 0.1v	Pass
DVM #5 Common	.01	< 0.1v	Pass
DVM #6 Common	.01	< 0.1v	Pass
DVM #7 Common	.01	< 0.1v	Pass
Oscilloscope RTN	.01	< 0.1v	Pass

SHOP ORDER NO.: 431618 DATE: 3.12.98

UNIT S/N: F04 TEST ENGINEER: Mark Platt

QUALITY ASSURANCE: MAR 17 98 7A 90 R. Stelly

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TEST DATA SHEET 3

(Paragraph 4.1)

TEST SETUP Verified: <u>Mark Schell</u> SIGNATURE				
STEP	TEST	MEASURED	MEASURED AFTER C25 SOLDERED IN PLACE	PASS/FAIL
12 to 15	A2E1, A2E2 Voltage Check	A2E1= <u>-1.01</u> -2.04 V A2E2= <u>-1.22</u> 1.69 V	A2E1= <u>-2.09</u> V A2E2= <u>1.70</u> V	N/A
	Calculate Percent ** Difference By ABS ((E _a -E _b)/E _a) X 100	<u>22</u> 20 %	<u>21</u> %	N/A
	Is % Difference less Than 25%	<u>X</u> Yes No	<u>X</u> Yes No	* Pass
15, 19	Record C25 Value	C25= <u>40</u> 7.5 pF	C25= <u>7.5</u> pF	N/A
21	Decade Box Setting Minimize Voltage	N/A N/A	<u>5620</u> Ohms <u>.042</u> V	N/A N/A
22	Record R2 Value	N/A	R2= <u>5620</u> Ohms <u>5110</u>	N/A

* REQUIREMENT = YES = PASS

** WHERE E_a IS THE LARGER AND E_b IS THE SMALLER OF THE MEASURED VOLTAGES.

UNIT PART NO. 1349360-1 UNIT SERIAL NO.: F04

SHOP ORDER NO.: 431618

TEST ENGINEER: Mark Schell

QUALITY ASSURANCE: A. Hilly 7A 190 MAR 17 98

DATE: 3.12.98 TECHNICIAN: N/A Mark Schell

Re-tuned 3/23/98
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no longer valid. See next
page.

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TEST DATA SHEET 3

(Paragraph 4.1)

TEST SETUP Verified: Mark G. Galt

SIGNATURE

STEP	TEST	MEASURED	MEASURED AFTER C25 SOLDERED IN PLACE	PASS/FAIL
12 to 15	A2E1, A2E2 Voltage Check	A2E1= <u>-919</u> V A2E2= <u>1.04</u> V	A2E1= <u>-924</u> V A2E2= <u>1.09</u> V	N/A
	Calculate Percent ** Difference By ABS ((E _a -E _b)/E _a) X 100	<u>10.8</u> %	<u>10.8</u> %	N/A
	Is % Difference less Than 25%	<u>X</u> Yes No	<u>X</u> Yes No	* <u>Pass</u>
15, 19	Record C25 Value	C25= <u>7.8</u> pF	C25= <u>7.8</u> pF	N/A
21	Decade Box Setting Minimize Voltage	N/A N/A	<u>5004</u> Ohms <u>±7</u> mV	N/A N/A
22	Record R2 Value	N/A	R2= <u>5110</u> Ohms	N/A

* REQUIREMENT = YES = PASS

** WHERE E_a IS THE LARGER AND E_b IS THE SMALLER OF THE MEASURED VOLTAGES.

UNIT PART NO. 1348360-1

UNIT SERIAL NO.: F04

SHOP ORDER NO.: 431618

TEST ENGINEER: Mark G. Galt

QUALITY ASSURANCE: 7A 268 MAR 25 '98

DATE: 3.23.98

TECHNICIAN: Mark G. Galt

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TEST DATA SHEET 4
(Paragraph 4.1)

STEP	TEST	MEASURED	EXPECTED	PASS/FAIL
25	Voltage Measurement	A2E1= <u>-1.40</u> V A2E2= <u>2.13</u> V Sum: <u>.098</u> V	N/A	N/A
28	Voltage Measurement	A2E1= <u>-1.21</u> V A2E2= <u>2.45</u> V Sum: <u>.098</u> V	N/A	N/A
29	a) +15v voltage +15v current -15v voltage -15v current	<u>15.0</u> V <u>532</u> mA <u>-15.0</u> V <u>-55.9</u> mA	+15v \pm 0.1v 600 mA max -15v \pm 0.1v 100 mA max	Pass
	b) 57.290344GHZ RF output	<u>19.1</u> dBm	18.5dBm \pm 1.5dB	19.1 Pass
	c) 6.87GHz RF output	<u>11.2</u> dBm	12dBm \pm 2.0dB	Pass

UNIT PART NO. 1348360-1 SHOP ORDER NO.: 431618

UNIT SERIAL NO.: F04 TEST ENGINEER: Mark G. Dahl

DATE: 3.16.98 QUALITY ASSURANCE: MAR 17 98 7A
190 R. H. H.

Re-tuned 3/23/98.

Information on this page no longer valid see
next page

TEST DATA SHEET 4
(Paragraph 4.1)

STEP	TEST	MEASURED	EXPECTED	PASS/FAIL
25	Voltage Measurement	A2E1= <u>-735</u> V A2E2= <u>1.52</u> V Sum: <u>.060</u> V	N/A	N/A
28	Voltage Measurement	A2E1= <u>-1.812</u> V A2E2= <u>1.48</u> V Sum: <u>.063</u> V	N/A	N/A
29	a) +15v voltage +15v current -15v voltage -15v current	<u>+15.0</u> V <u>532</u> mA <u>-15.0</u> V <u>-57.4</u> mA	+15v \pm 0.1v 600 mA max -15v \pm 0.1v 100 mA max	Pass
	b) 57.290344GHZ RF output	<u>19.2</u> dBm	18.5dBm \pm 1.5dB	Pass
	c) 6.87GHz RF output	<u>11.2</u> dBm	12dBm \pm 2.0dB	Pass

UNIT PART NO. 1348360-1
SHOP ORDER NO.: 431618

UNIT SERIAL NO.: F04
TEST ENGINEER: M. K. [Signature]

DATE: 323.78
QUALITY ASSURANCE: 7A 268 MR 25 18

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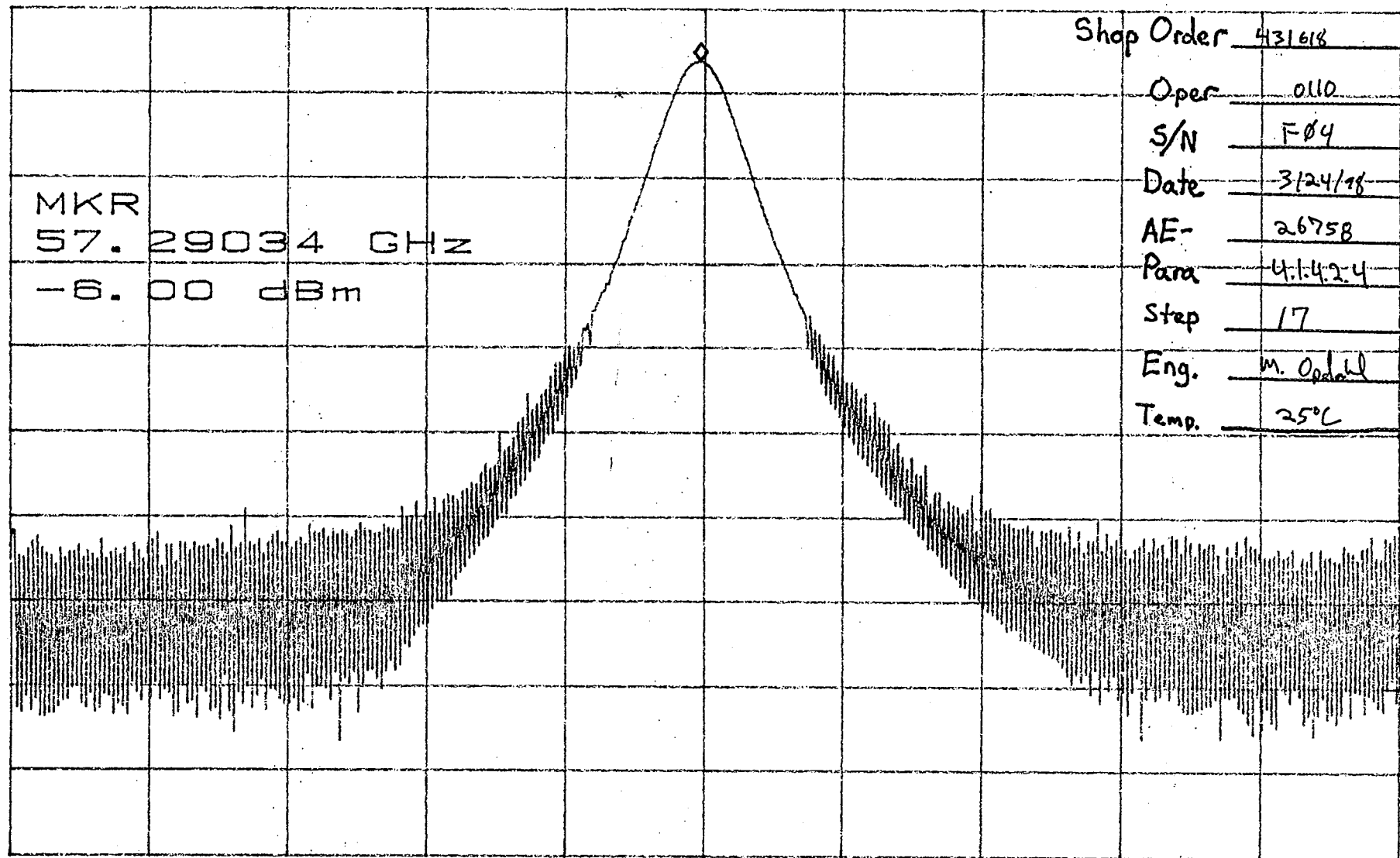
L 30.0dB

RL 0dBm

10dB/

MKR -6.00dBm

57.29034GHz



Shop Order 431618

Oper 0110

S/N F04

Date 3/24/18

AE- 26758

Para 4.1.4.2.4

Step 17

Eng. m. Opatell

Temp. 25°C

CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

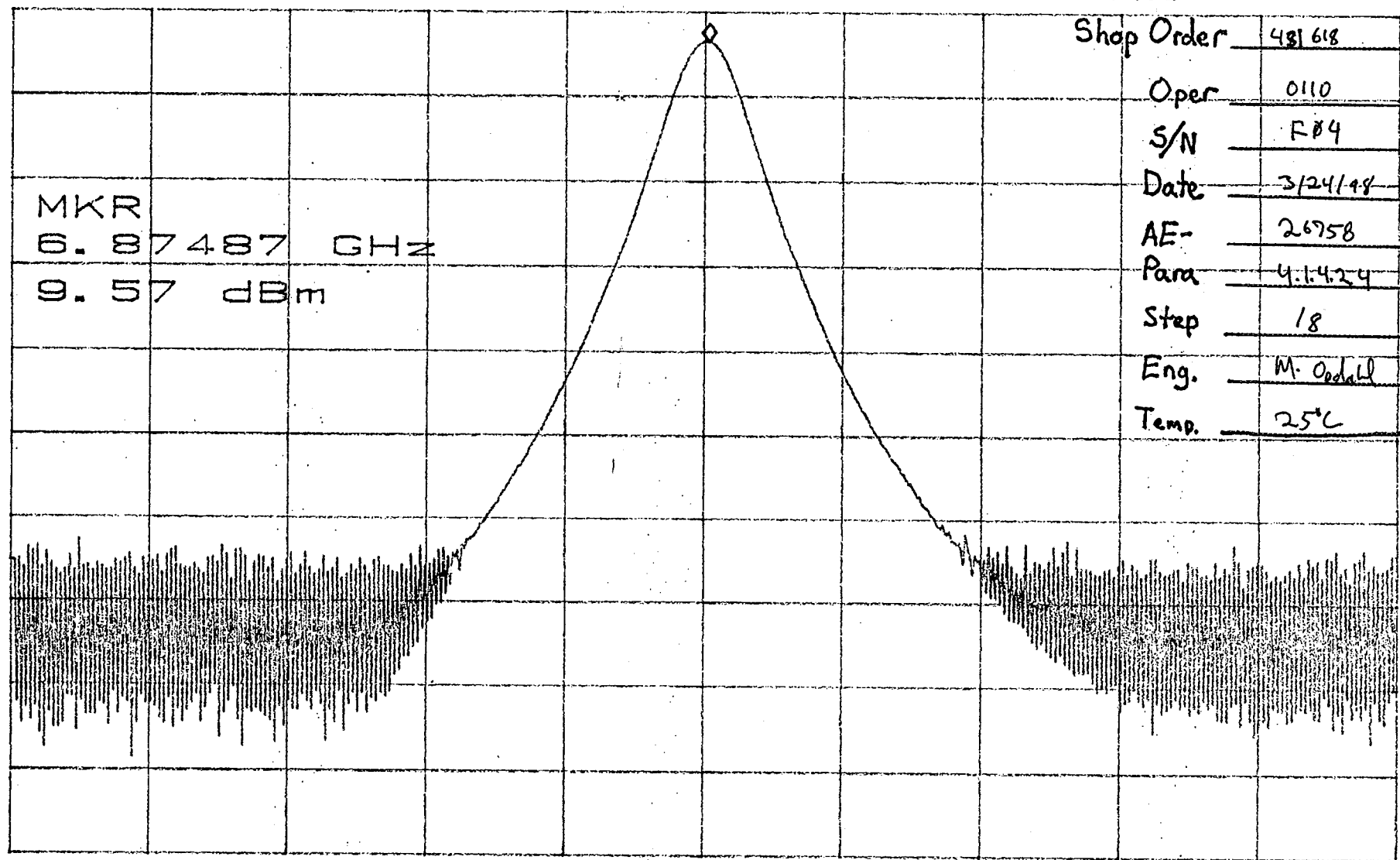
ATTEN 30dB

RL 12.9dBm

MKR 9.57dBm

6.87487GHz

10dB/



Shop Order	481618
Oper	0110
S/N	R84
Date	3/24/98
AE-	26958
Para	4.1.4.24
Step	18
Eng.	M. Oodahl
Temp.	25°C

CENTER 6.87484GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

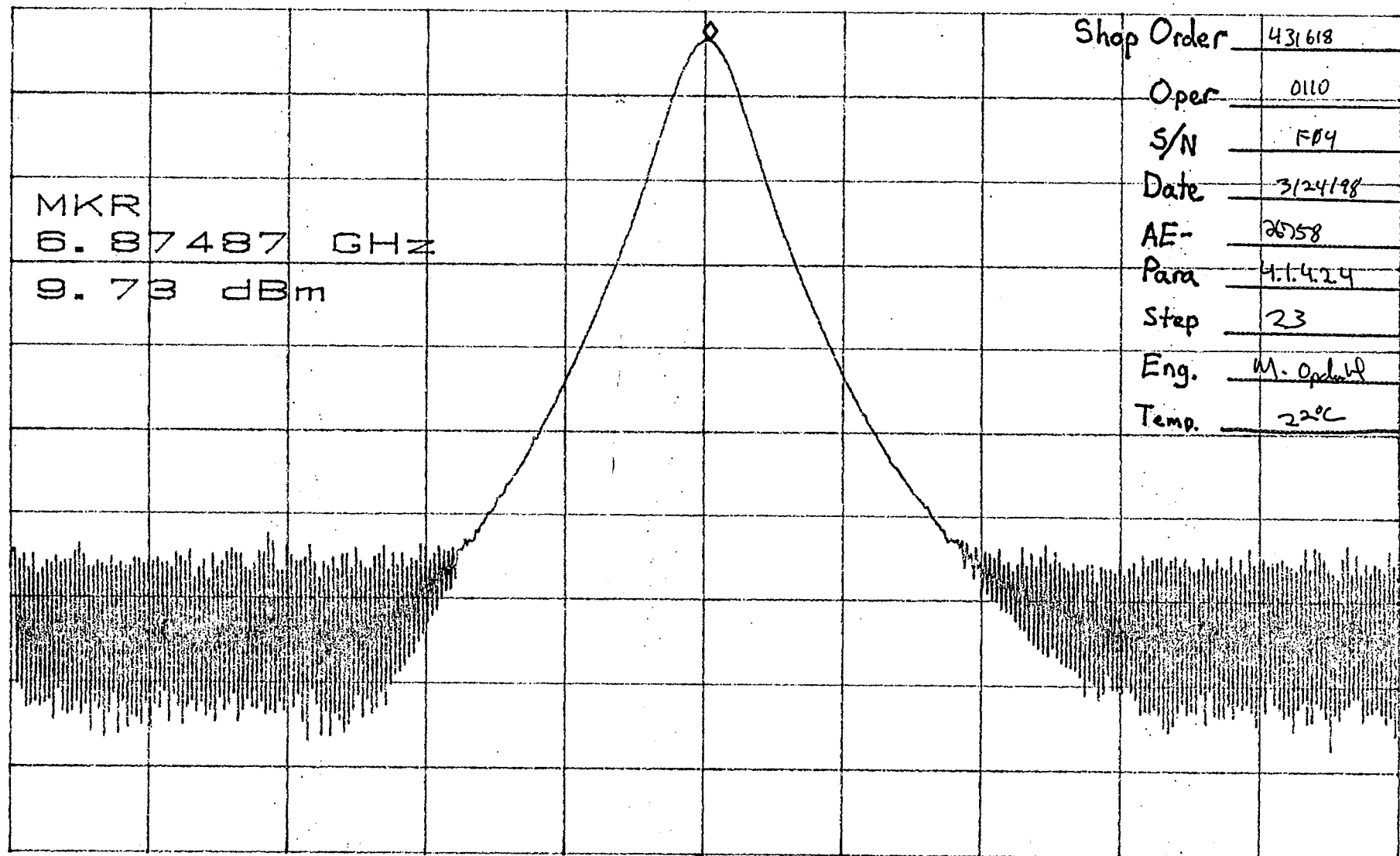
ATTEN 30dB

RL 12.9dBm

10dB/

MKR 9.73dBm

6.87487GHz



Shop Order	431618
Oper	0110
S/N	F04
Date	3/24/98
AE-	2558
Para	4.1.4.24
Step	23
Eng.	M. Ophel
Temp.	22°C

CENTER 6.87484GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

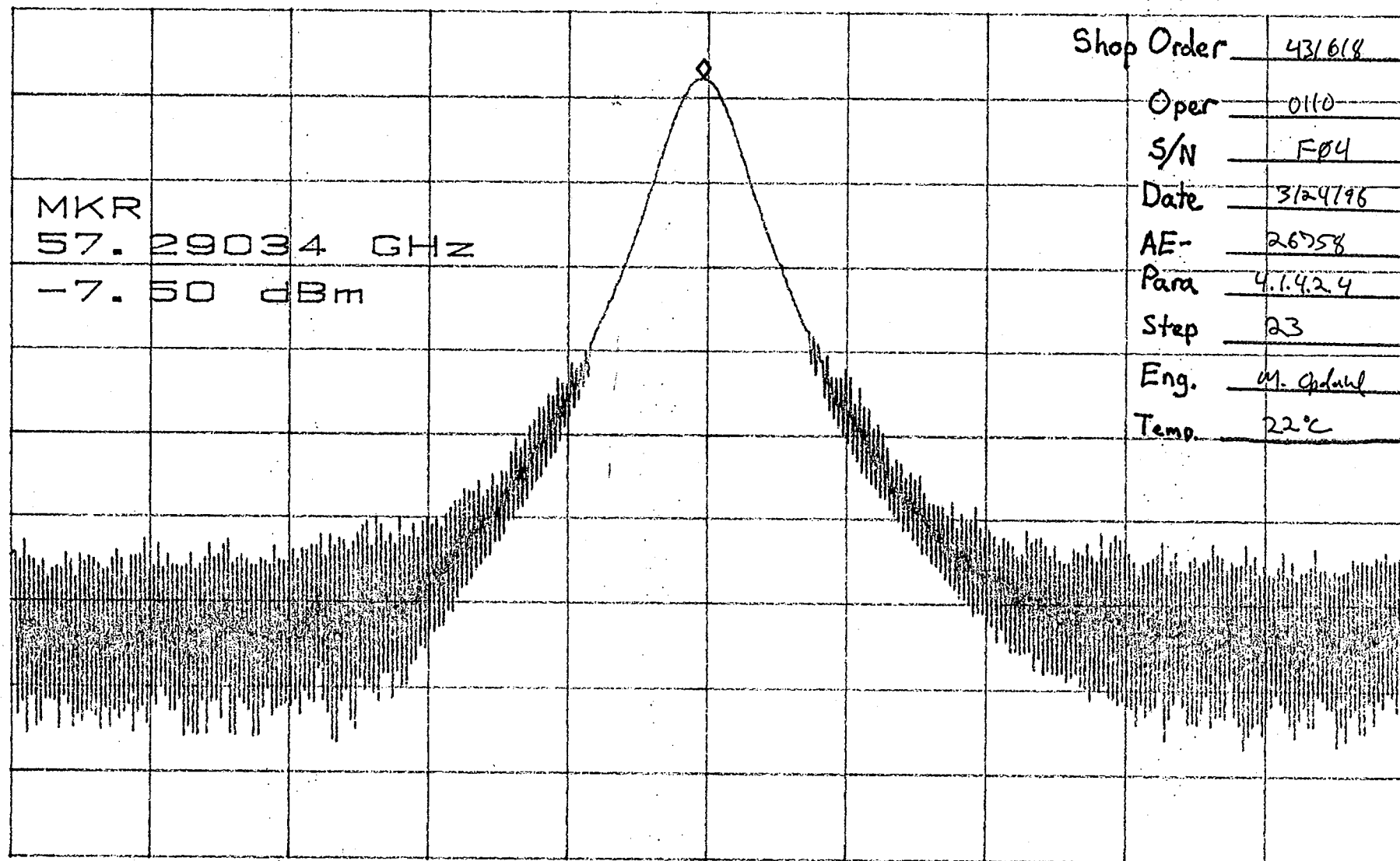
L 30.0dB

RL 0dBm

10dB/

MKR -7.50dBm

57.29034GHz



Shop Order 431618

Oper 0110

S/N F04

Date 3/29/96

AE- 26758

Para 4.1.4.2.4

Step 23

Eng. M. Gidani

Temp. 22°C

MKR
57.29034 GHz
-7.50 dBm

CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

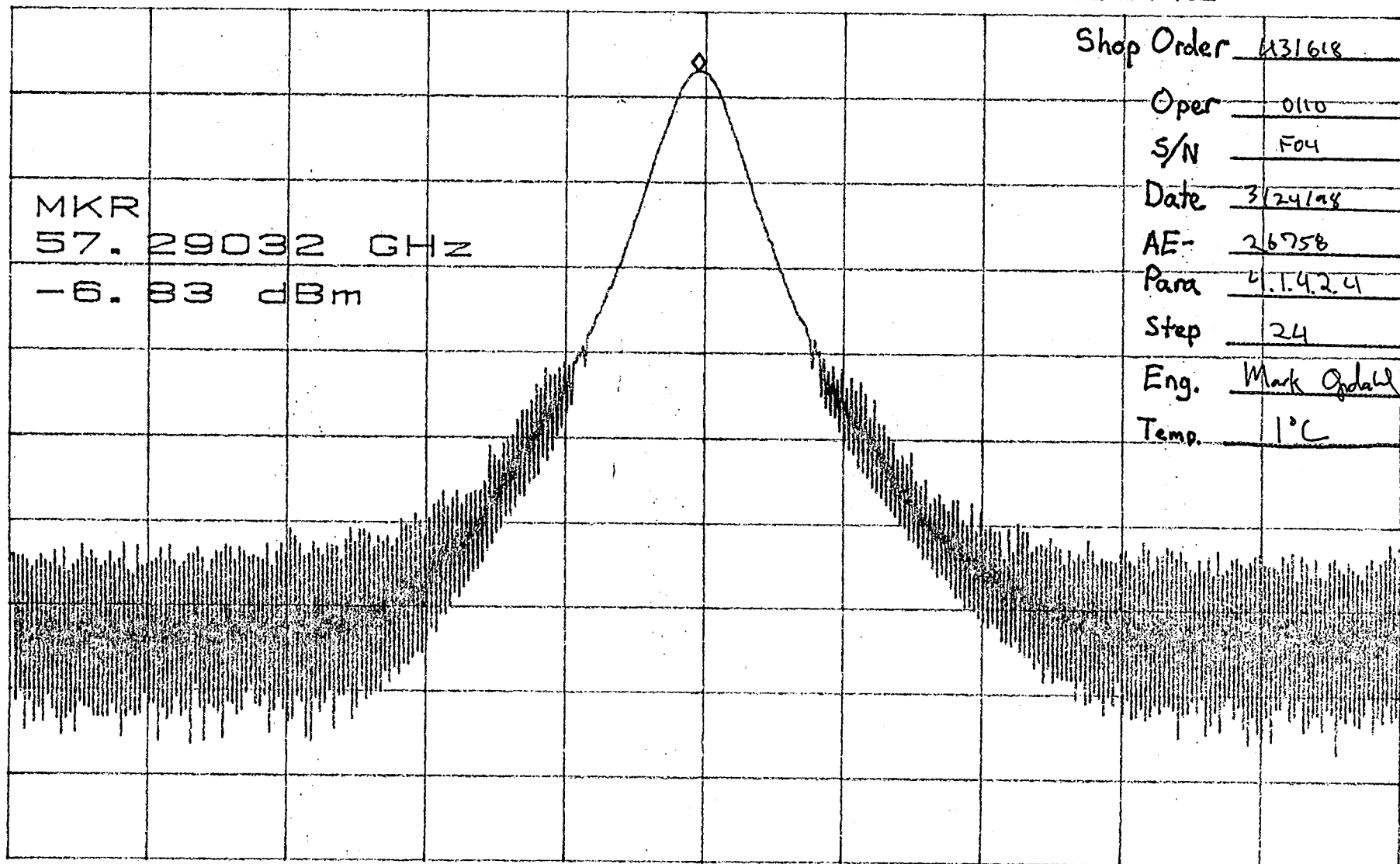
L 30.0dB

RL 0dBm

10dB/

MKR -6.83dBm

57.29032GHz



CENTER 57.29037GHz

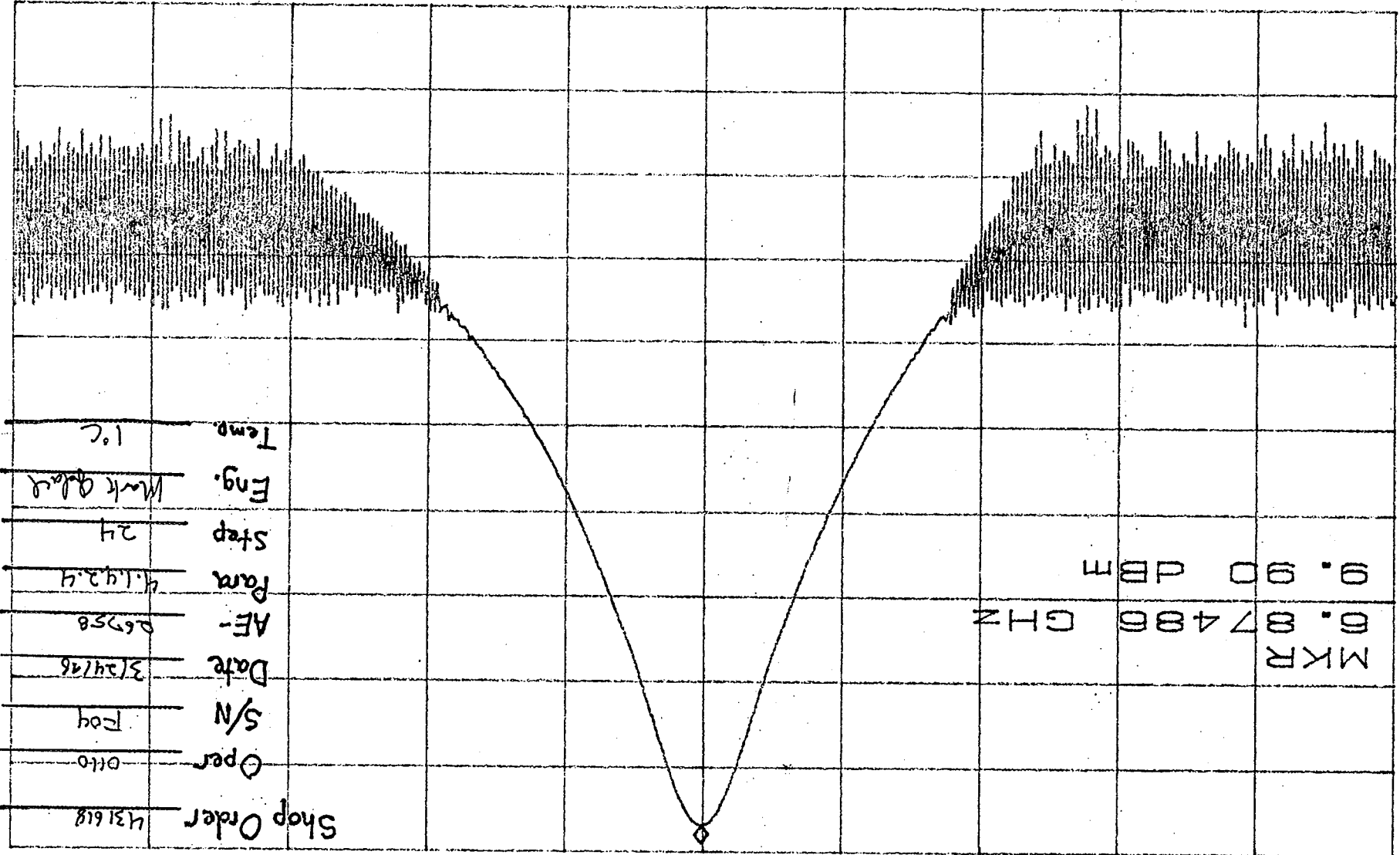
SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

ATTEN 30dB
 RL 12.9dBm
 MKR 9.90dBm
 6.87486GHz



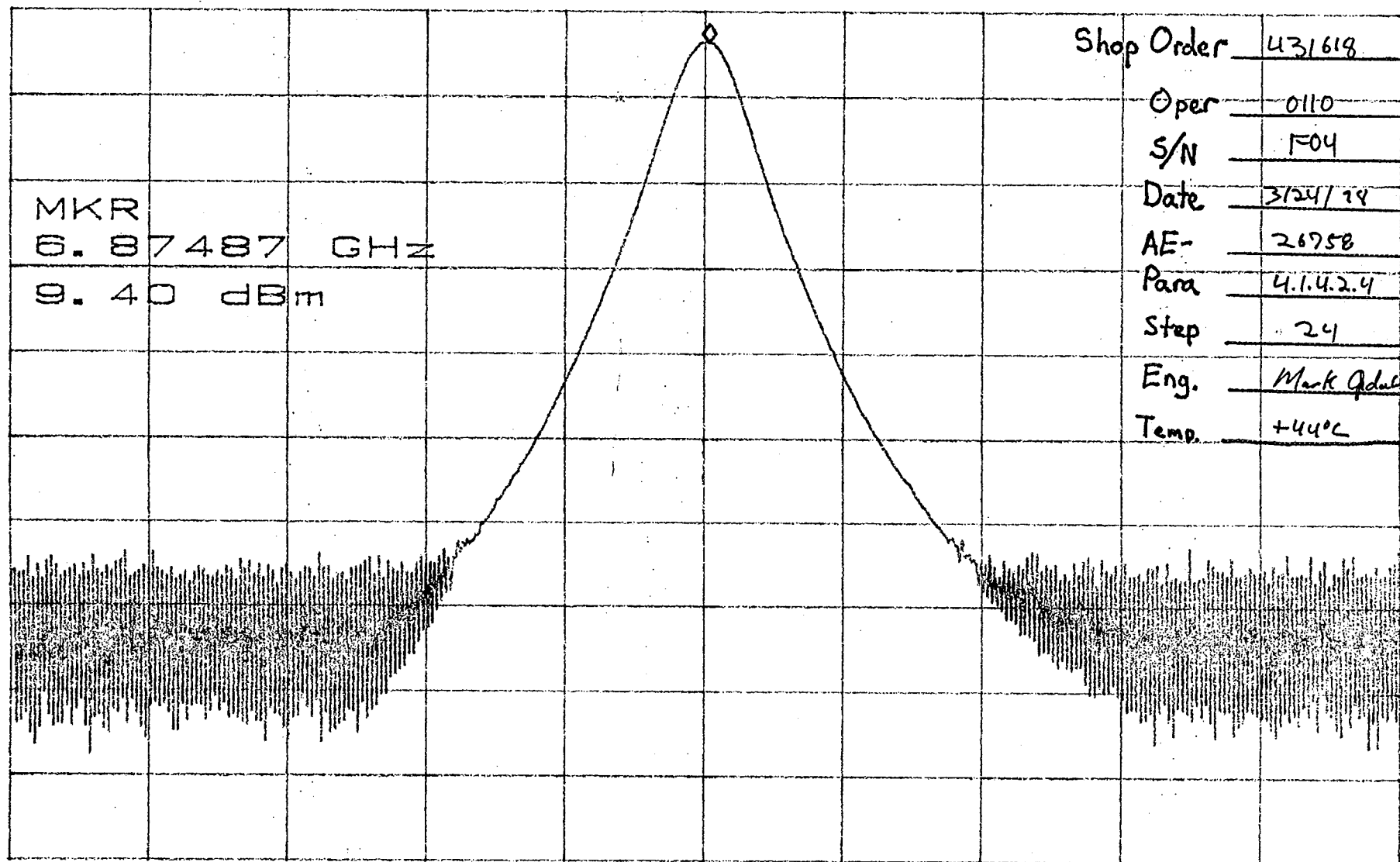
Shop Order 431618
 Oper 0110
 S/N Roy
 Date 3/24/16
 AE- 067258
 Para 4.143.4
 Step 24
 Eng. Mark Glad
 Temp. 1°C

CENTER 6.87484GHZ
 SPAN 10.00MHZ
 *RBW 300KHZ
 VBW 300KHZ
 SWP 50.0ms

ATTEN 30dB
RL 12.9dBm

10dB/

MKR 9.40dBm
6.87487GHz



Shop Order	431618
Oper	0110
S/N	F04
Date	3/24/18
AE-	26758
Para	4.1.4.2.4
Step	24
Eng.	Mark Qdall
Temp.	+44°C

CENTER 6.87484GHz SPAN 10.00MHz
*RBW 300kHz VBW 300kHz SWP 50.0ms

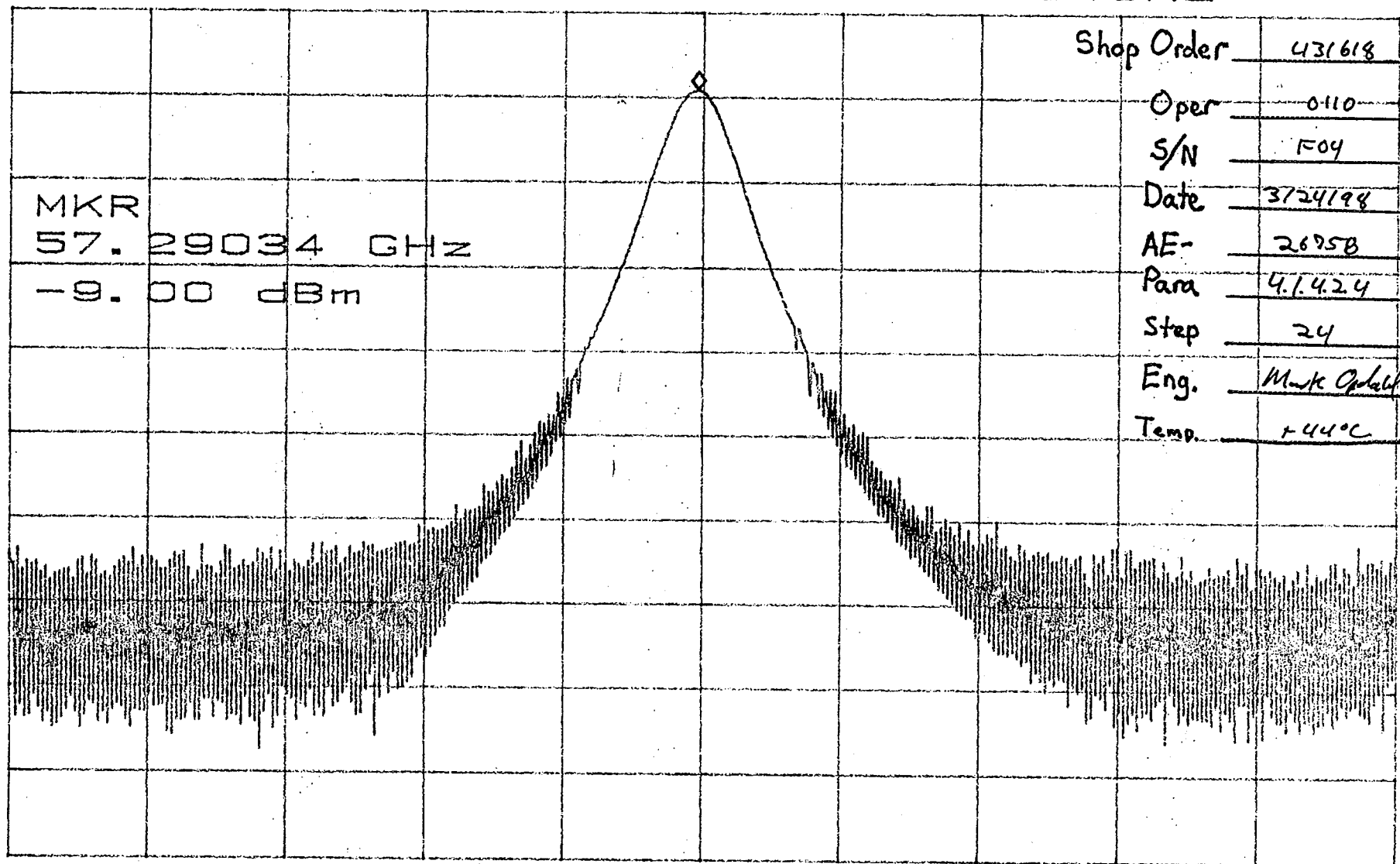
L 30.0dB

RL 0dBm

MKR -9.00dBm

10dB/

57.29034GHz



CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

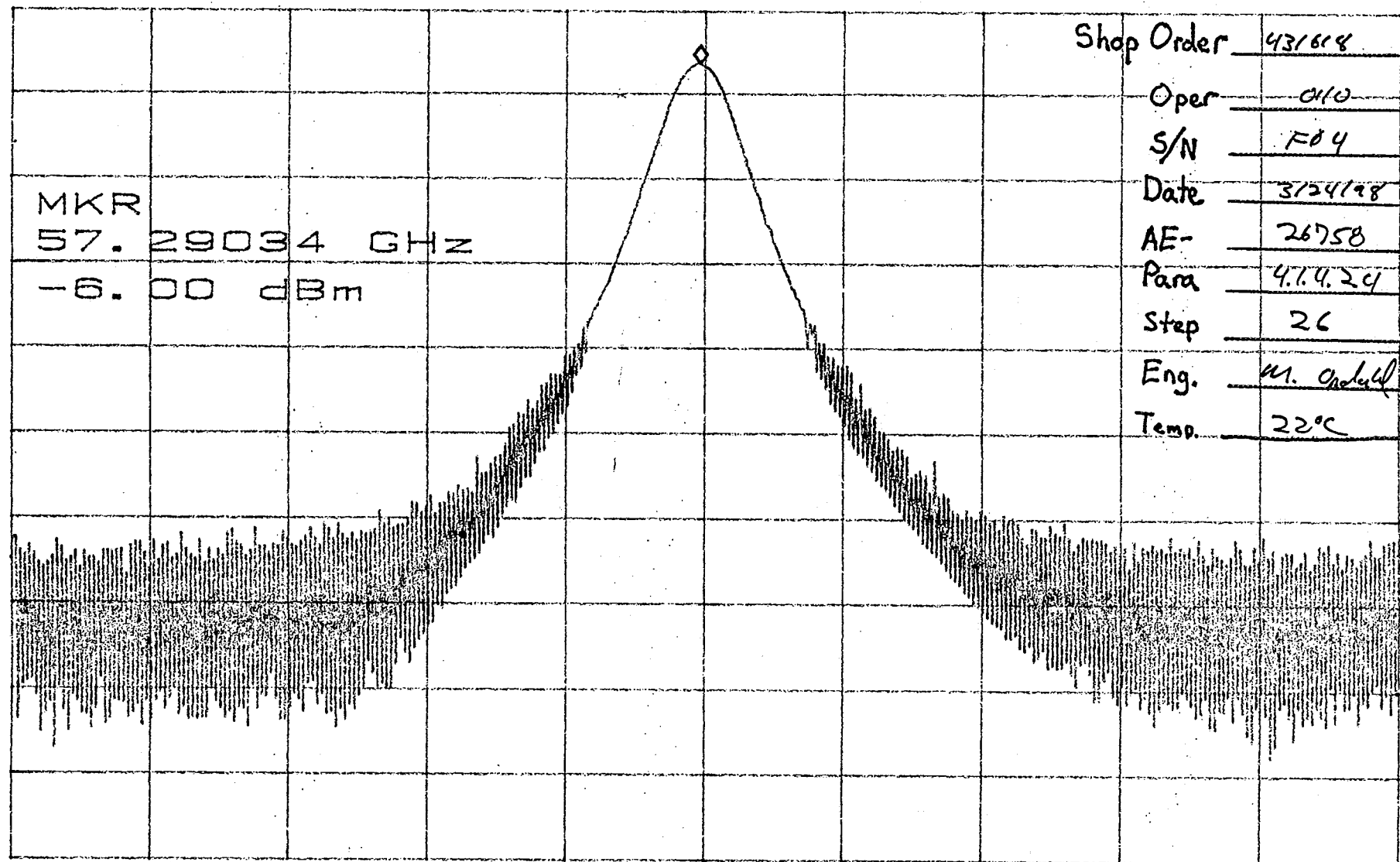
L 30.0dB

RL 0dBm

10dB/

MKR -6.00dBm

57.29034GHz



CENTER 57.29037GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

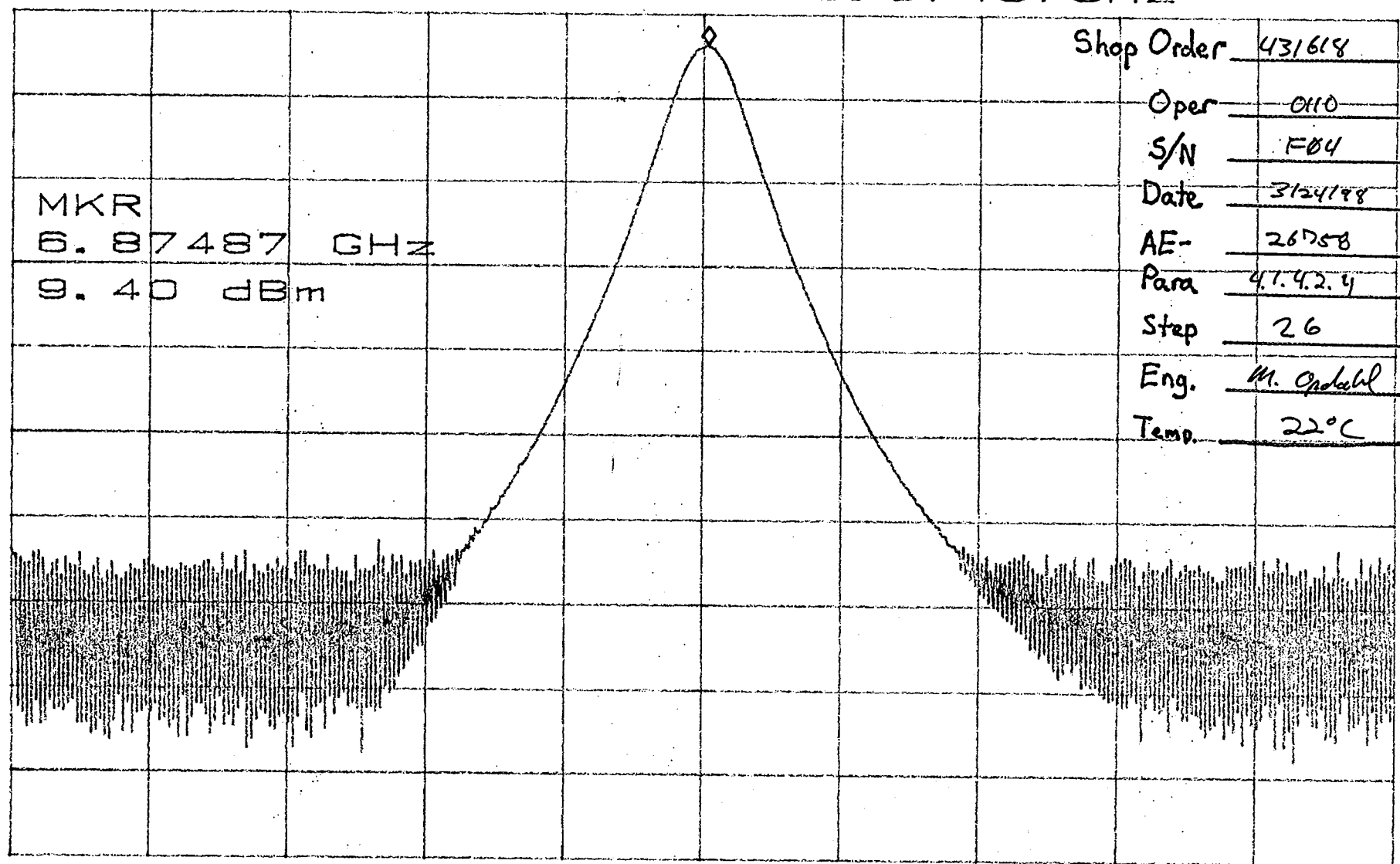
ATTEN 30dB

RL 12.9dBm

10dB/

MKR 9.40dBm

6.87487GHz



Shop Order	431618
Oper	0110
S/N	F04
Date	3/24/98
AE-	26758
Para	4.1.4.2.4
Step	26
Eng.	M. Opdehl
Temp.	22°C

CENTER 6.87484GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SWP 50.0ms

6BA

TEST DATA SHEET (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Test Setup Verified. Signature

~~Post-Thermal Cycling CPT~~
~~PRE-Environmental CPT~~

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.005	Pass
	Spectrum Analyzer	< 1.0 Vac	.005	Pass
	Frequency Counter Chassis	< 1.0 Vac	.004	Pass
	Power Meter Chassis	< 1.0 Vac	.002	Pass
4	Evacuate vacuum chamber and record pressure	< 10^{-2} torr	Pressure = <u>torr</u> <u>N/A Ambient</u>	<u>N/A</u>
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = <u>22.5</u> °C	Pass
			TC2 = <u>22.9</u> °C	N/A
			TC3 = <u>21.5</u> °C	N/A
6	DRO L/A	$\pm 10 \pm 1$ V	DRO L/A = <u>.057</u> V	Pass
	PLO L/A	$\pm 10 \pm 1$ V	PLO L/A = <u>.048</u> V	Pass
	Is PLO locked?	Yes	Yes <u>X</u> No	Pass
7	PLO Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.290332676</u> GHz	Pass
	PLO Power	17 to 20 dBm	P = <u>19.5</u> dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>+15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>529</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>52.4</u> mA	Pass
	DRO L/A Voltage	$\pm 10 \pm 1$ V	DRO L/A = <u>57</u> mV	Pass
	PLO L/A Voltage	$\pm 10 \pm 1$ V	PLO L/A = <u>49</u> mV	Pass
12	RF Output Power and Frequency	17 to 20 dBm	P = <u>19.5</u> dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.290332845</u> GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ± 2 °C	TC1 = <u>22.4</u> °C	Pass
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>+15.20</u> V	Pass
		-15.2 ± 0.05 V	-Voltage = <u>-15.20</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290332765</u> GHz	Pass
		17 to 20 dBm	P = <u>19.5</u> dBm	Pass

* Record data only if performing test under vacuum.

68A
TEST DATA SHEET (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

~~Post Thermal Cycling CPT~~
~~Pre-Environmental CPT~~

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>+14.60</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.81</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290322 966</u> GHz	Pass
		17 to 20 dBm	P = <u>19.5</u> dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	<u>See plots</u>	Pass
16	Power level of 114.58 GHz signal	< -10 dBm	Power of 114.58 GHz = <u>-74.6</u> dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>10 Hz</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>21</u> dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ± 2°C	TC1 = <u>1.30</u> C	Pass
			TC2 = <u>1.8</u> C	N/A
			TC3 = <u>0.5</u> C	N/A
		0 - 1V	DRO L/A = <u>46</u> mV	Pass
		0 - 1V	PLO L/A = <u>41</u> mV	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>+15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>517</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>55</u> mA	Pass
	DRO L/A Voltage	<u>< 1V 0 to 1</u>	DRO L/A = <u>46</u> mV	Pass
	PLO L/A Voltage	<u>< 1V 0 to 1</u>	PLO L/A = <u>41</u> mV	Pass
	RF Output Power	17 to 20 dBm	Power = <u>20</u> dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.290318 469</u> GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.2</u> V	Pass
		-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290318 445</u> GHz	Pass
		17 to 20 dBm	Power = <u>20</u> dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>+14.6</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.8</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290318 535</u> GHz	Pass
		17 to 20 dBm	Power = <u>20</u> dBm	Pass

6B A

TEST DATA SHEET 6 (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

Post Thermal Cycling EPT
Pre-Environmental CPT

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = <u>-75</u> dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>20</u> Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>23</u> dB Peak	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ± 2°C	TC1 = <u>44.4</u> °C	Pass
			TC2 = <u>45.1</u> °C	N/A
			TC3 = <u>44.5</u> °C	N/A
		0 - 1V	DRO L/A = <u>107</u> mV	Pass
		0 - 1V	PLO L/A = <u>78</u> μV	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>541</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>59.4</u> mA	Pass
	DRO L/A Voltage	<u>< 1V 0 to 1V</u>	DRO L/A = <u>109</u> mV	Pass
	PLO L/A Voltage	<u>< 1V 0 to 1V</u>	PLO L/A = <u>78</u> μV	Pass
	RF Output Power and	17 to 20 dBm	Power = <u>18.4</u> dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.29032758</u> GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.2</u> V	Pass
		-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29032760</u> GHz	Pass
		17 to 20 dBm	Power = <u>18.4</u> dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.8</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.8</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29032761</u> GHz	Pass
		17 to 20 dBm	Power = <u>18.4</u> dBm	Pass

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1675

AE-26758A
21 Jan 98

684
TEST DATA SHEET (Sheet 4 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

Post Thermal Cycling CPT
Pre-Environmental CPT

Step	Test	Expected	Measured	Pass/Fail
22	Spurious and Sub	-200 to -90 dBc	See Plots	Pass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = -67 dBm	Pass
Load VSWR and Frequency Pulling				
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 10 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.3 dB Peak	N/A

Shop Order No.: 431618
Operation: 0110
Unit Serial No.: F04
Date: 3/27/98

Test Engineer: [Signature]
Quality Assurance: [Signature]
Grate Rep: [Signature]
BEME: [Signature]



MAR 27 98



4-20-98

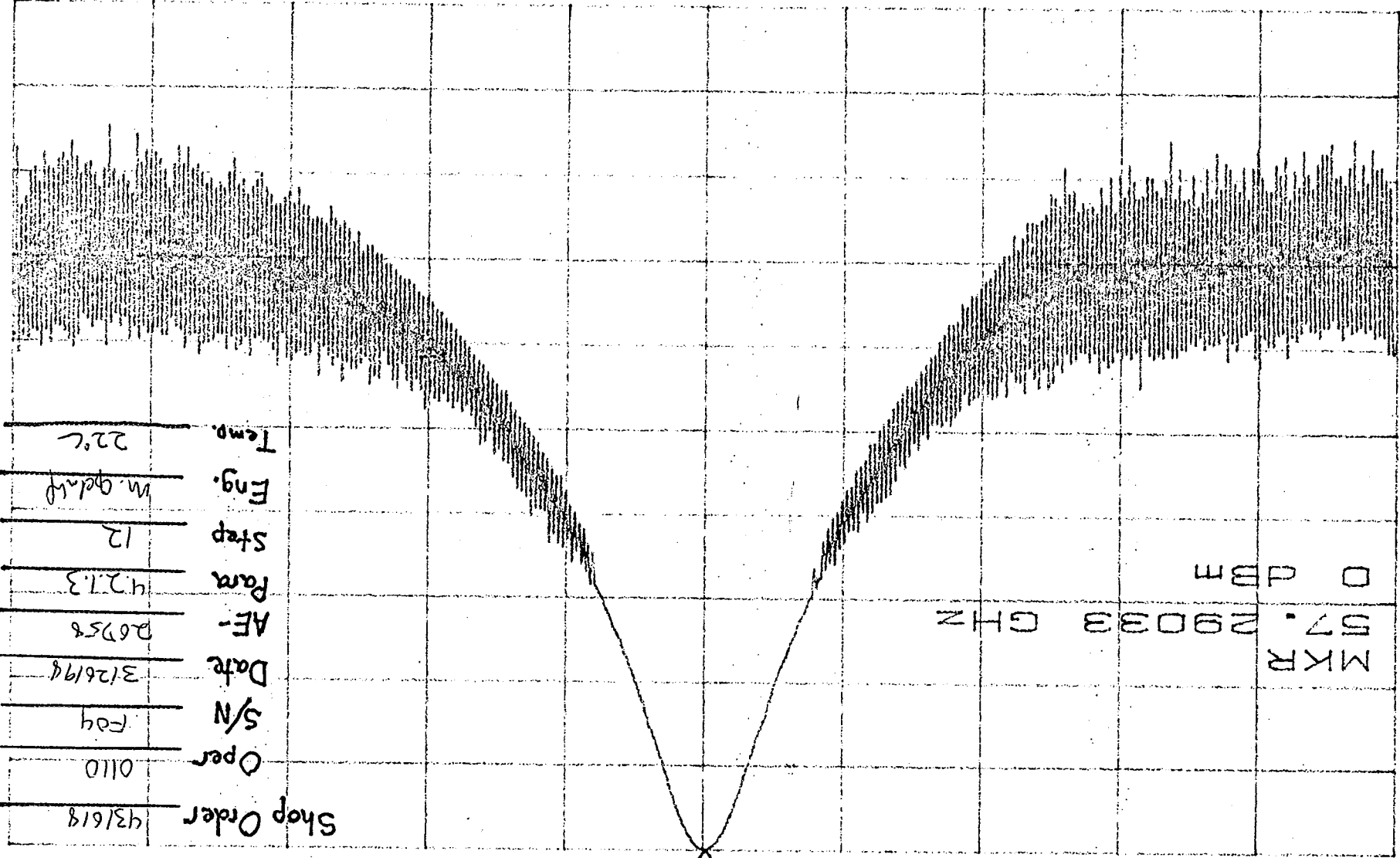
101 MAR

L 30.0dB

RL 0dBm

MKR 0dBm

57.29033GHz



Shop Order

43/618

Oper

0110

S/N

F04

Date

3/26/94

AE-

26758

Para

42.13

Step

12

Eng.

m. gnd. f

Temp.

22°C

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

SMP 50.0ms

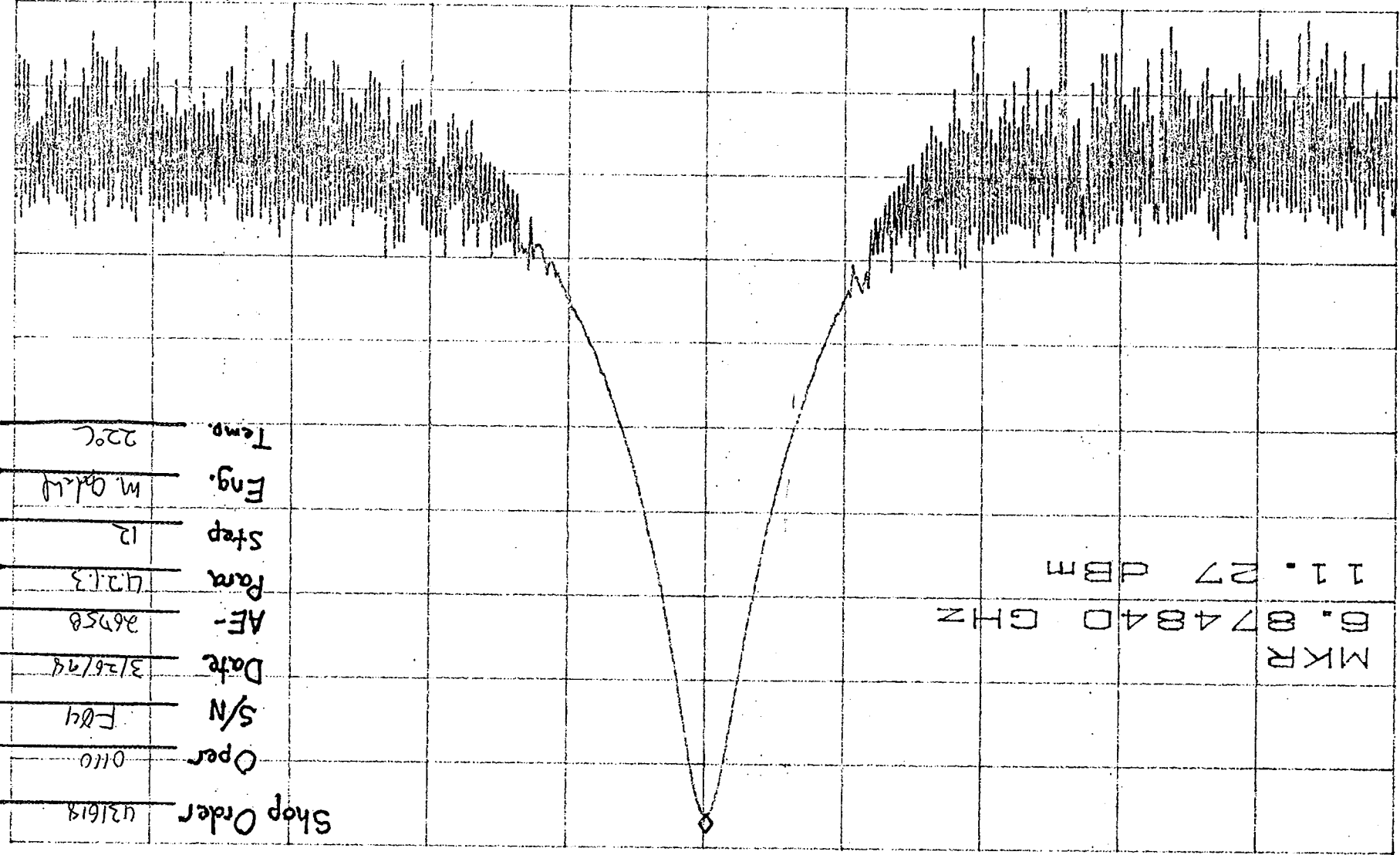
MAR 27 98 OCT 11

ATTEN 30dB

RL 15.1dBm

MKR 11.27dBm

6.874840GHz



MKR
6.874840 GHz
11.27 dBm

Shop Order 431618
Oper 0110
S/N F04
Date 3/26/98
AF- 26758
Para 4213
Step 12
Eng. M. G. L. L.
Temp. 22°C

CENTER 6.874843GHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0MHz

7A
190

MAR 22

CL 30.0dB
RL 0dBm

VAVG 18
10dB/

MKR -97.00dBm
56.8605573GHz

Shop Order 43618

Oper 0110

S/N F04

Date 3/26/89

AE- 26758

Para 4.2.1.3

Step 15

Eng. m. g. l. l.

Temp. 22°C

CENTER
56.8605581 GHz

D

CENTER 56.8605581GHz

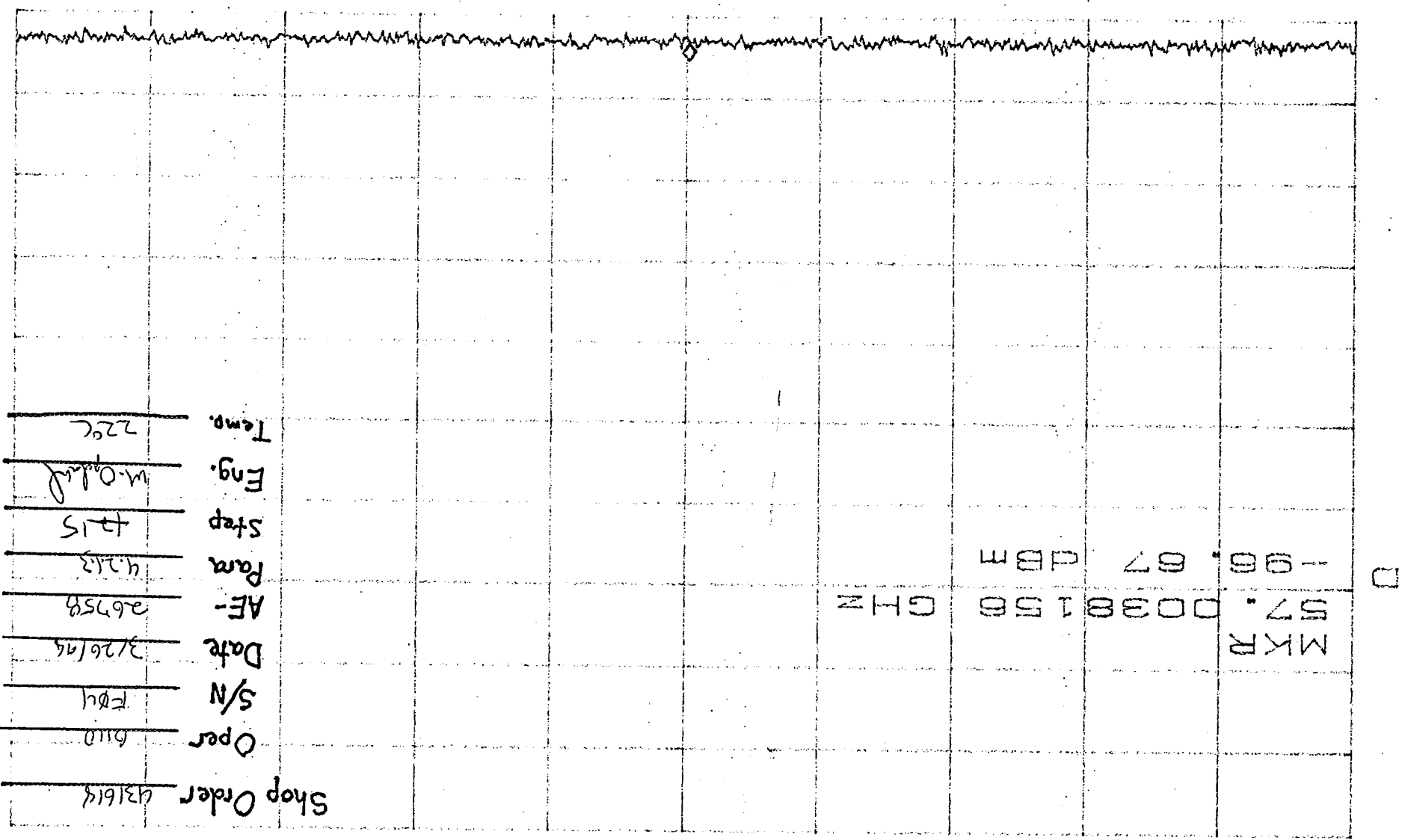
SPAN 500.0KHz

*RBW 3.0KHz

*VBW 1.0KHz

SWP 420ms

CL 30.0dB VAVG 22 MKR -96.67dBm
RL 0dBm 10dB/ 57.0038156GHz



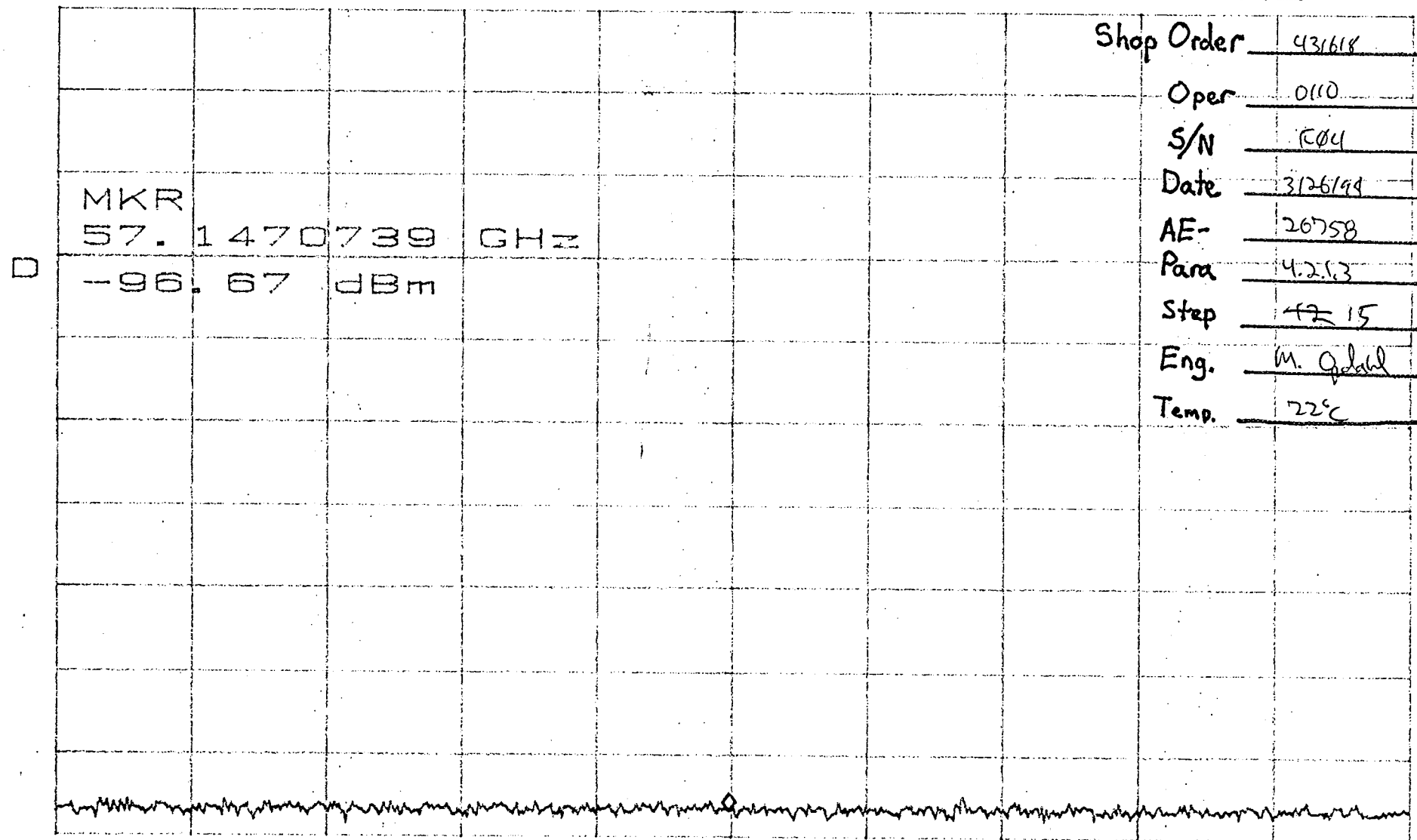
Shop Order 431614
Oper 6110
S/N F04
Date 3/26/94
AF- 26758
Pam 4.213
Step 4215
Eng. W. O. J. L.
Temp. 22°C

CENTER 57.0038156GHz
SPAN 500.0KHz
*RBW 3.0KHz *VBW 1.0KHz
SWP 420ms

CL 30.0dB
RL 0dBm

VAVG 42
10dB/

MKR -96.67dBm
57.1470739GHz



CENTER 57.1470747GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms

CL 30.0dB

VAVG 29

MKR -96.33dBm

RL 0dBm

10dB/

57.4335905GHz

Shop Order 43164Oper 0110S/N F04Date 3/26/98AE- 26258Para 4.2.1.3Step 15Eng. M. OjalaTemp. 22°CD
CENTER
57.4335913 GHz

CENTER 57.4335913GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB

VAVG 36

MKR -97.33dBm

RL 0dBm

10dB/

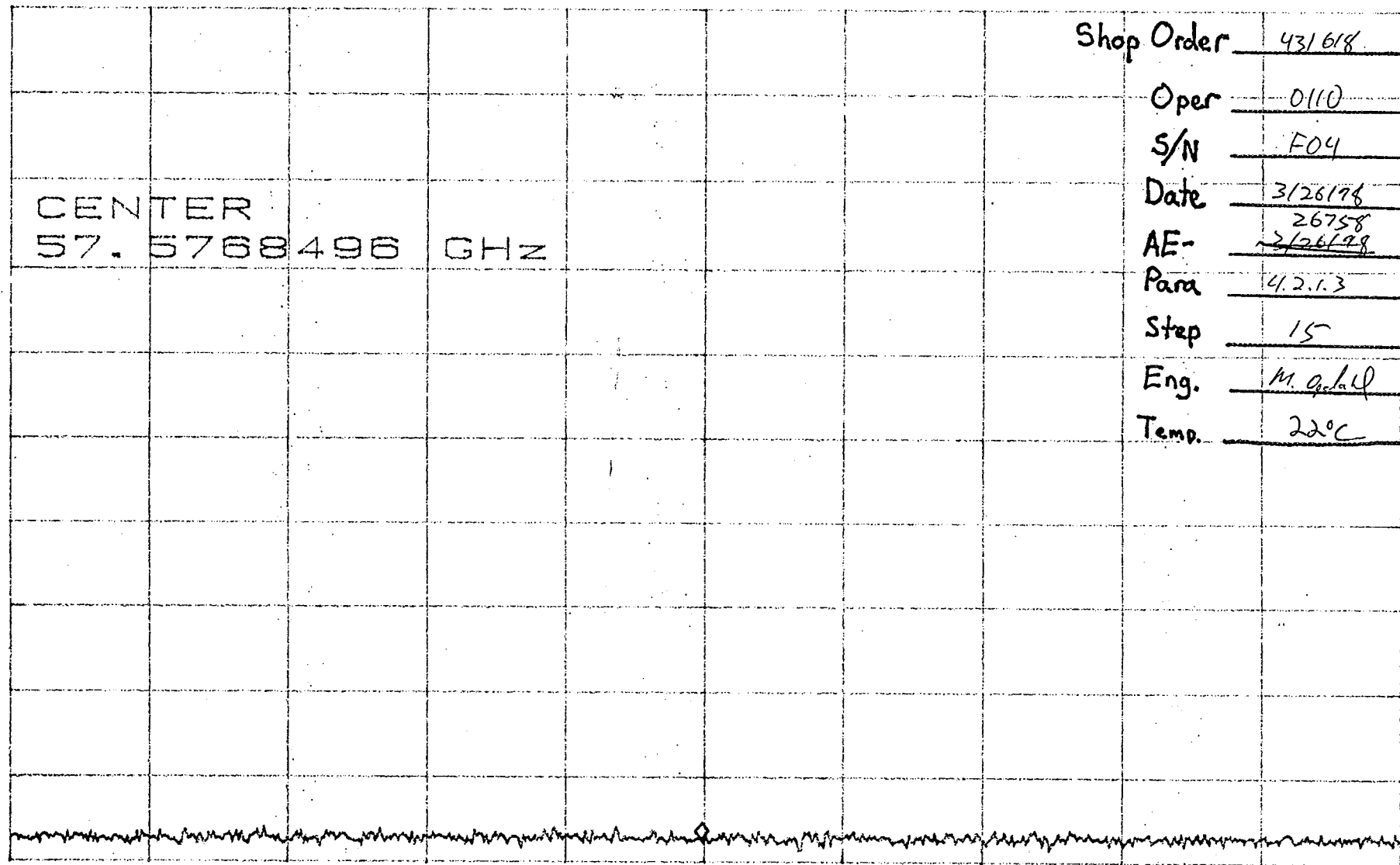
57.5768488GHz

Shop Order 431618Oper 0110S/N F04Date 3/26/98AE- 26758
3/26/98Para 4.2.1.3Step 15Eng. M. G. L. QTemp. 22°C

CENTER

57.5768496 GHz

D



CENTER 57.5768496GHz

SPAN 500.0kHz

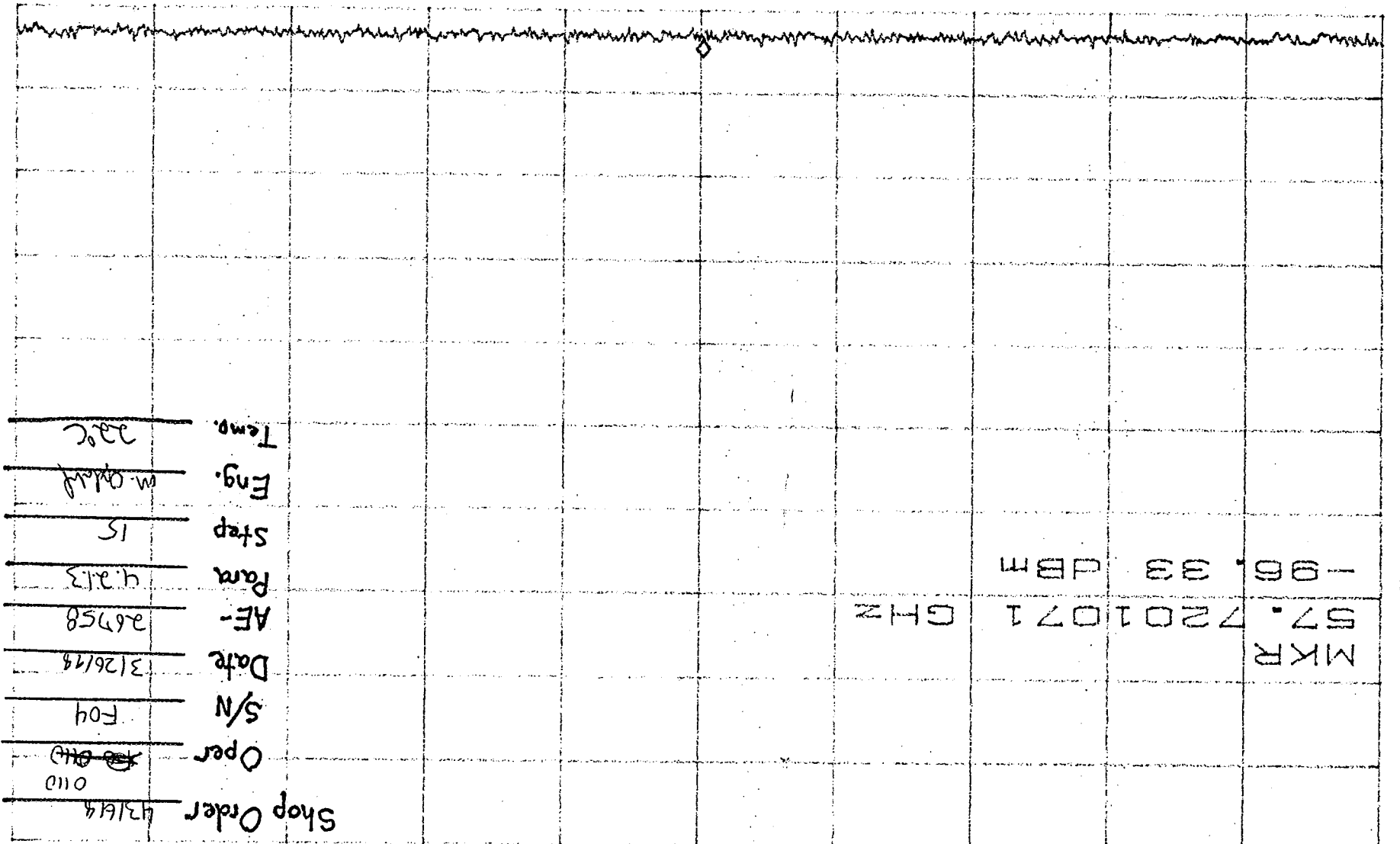
*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB VAVG 66 MKR -96.33dBm 57.7201071GHz

Shop Order 43164
Oper ~~0110~~
S/N F04
Date 3/26/98
AF- 26758
Pam 4.213
Step 15
Eng. m.014f
Temp. 22°C



CENTER 57.7201079GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms



MAR 27 98

L 30.0dB

RL 0dB

10dB/

MKR -74.67dBm

114.580683GHz

Shop Order 43618

Oper 0110

S/N F04

Date 3/26/98

AE- 26758

Para 4.2.13

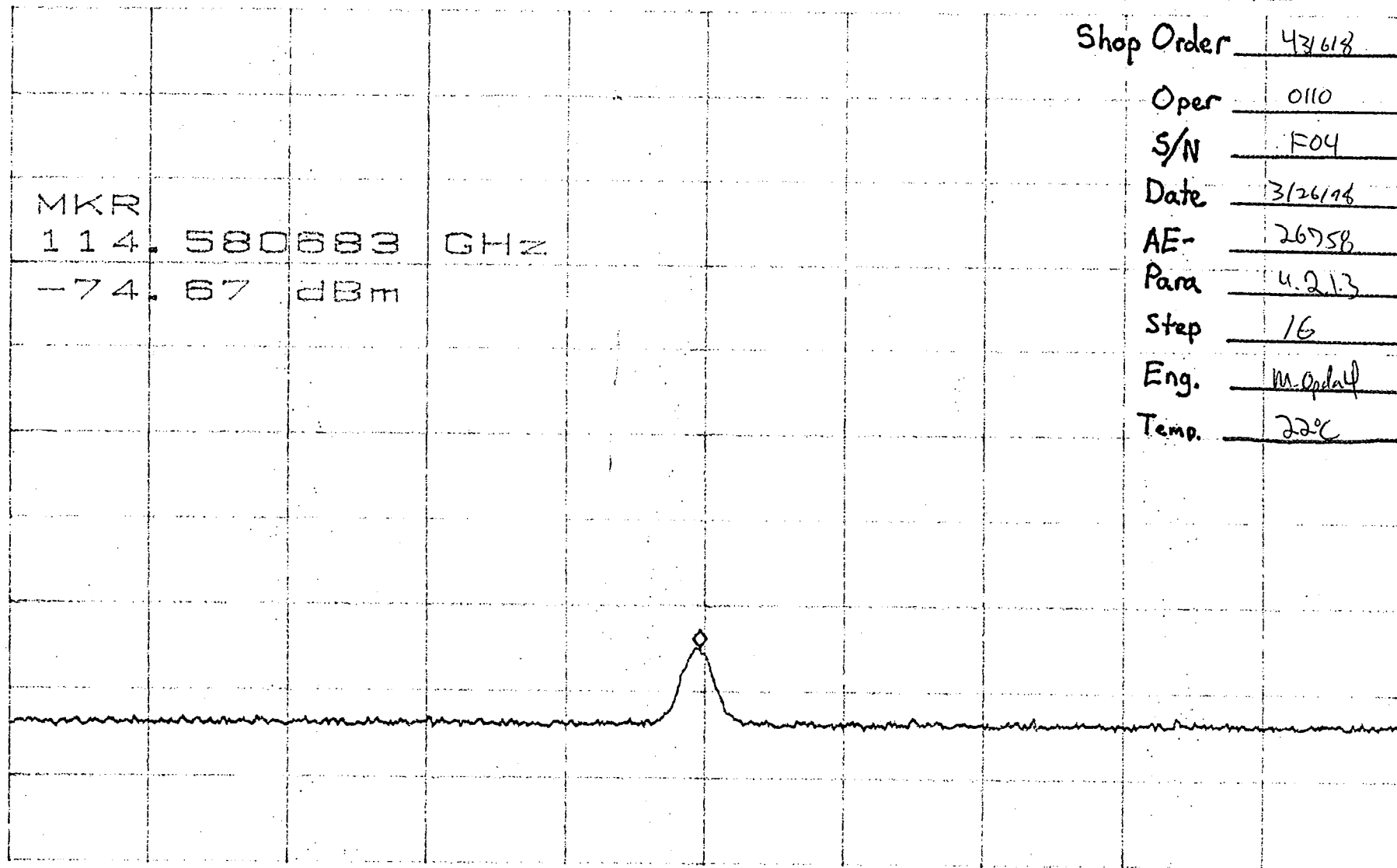
Step 16

Eng. M. Opata

Temp. 22°C

MKR
114.580683 GHz
-74.67 dBm

D



CENTER 114.580700GHz

SPAN 5.000MHz

*RBW 100kHz

*VBW 1.0kHz

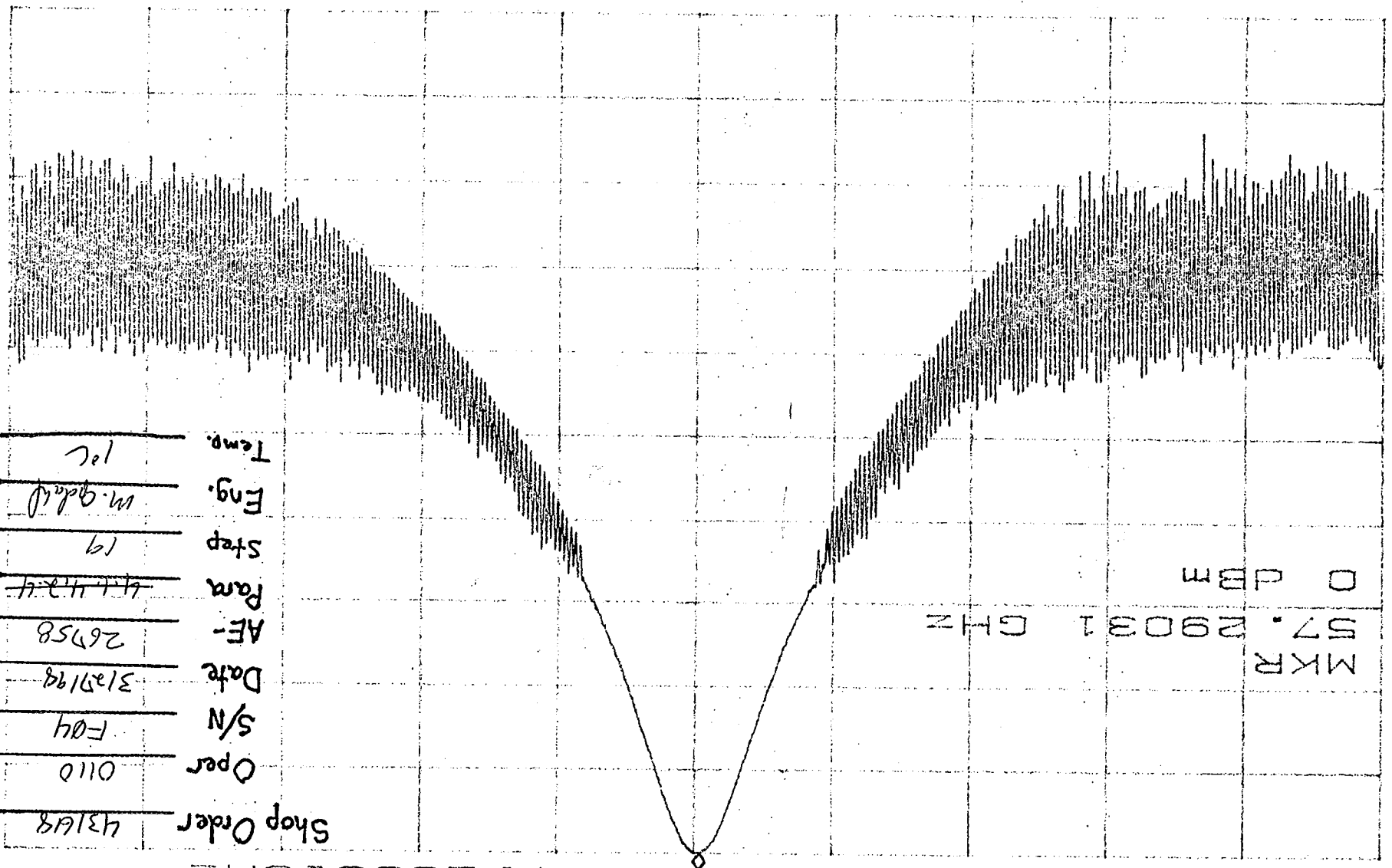
SWP 130ms

L 30.0dB

RL 0dBm

MKR
57.29031 GHz

0 dBm



MKR 0dBm

57.29031GHz

Shop Order

Oper

S/N

Date

AE-

Param

Step

Eng.

Temp.

43168

0110

F04

3/27/98

26758

44424-42

19

M. G. G. G.

10C

SPAN 10.00MHz

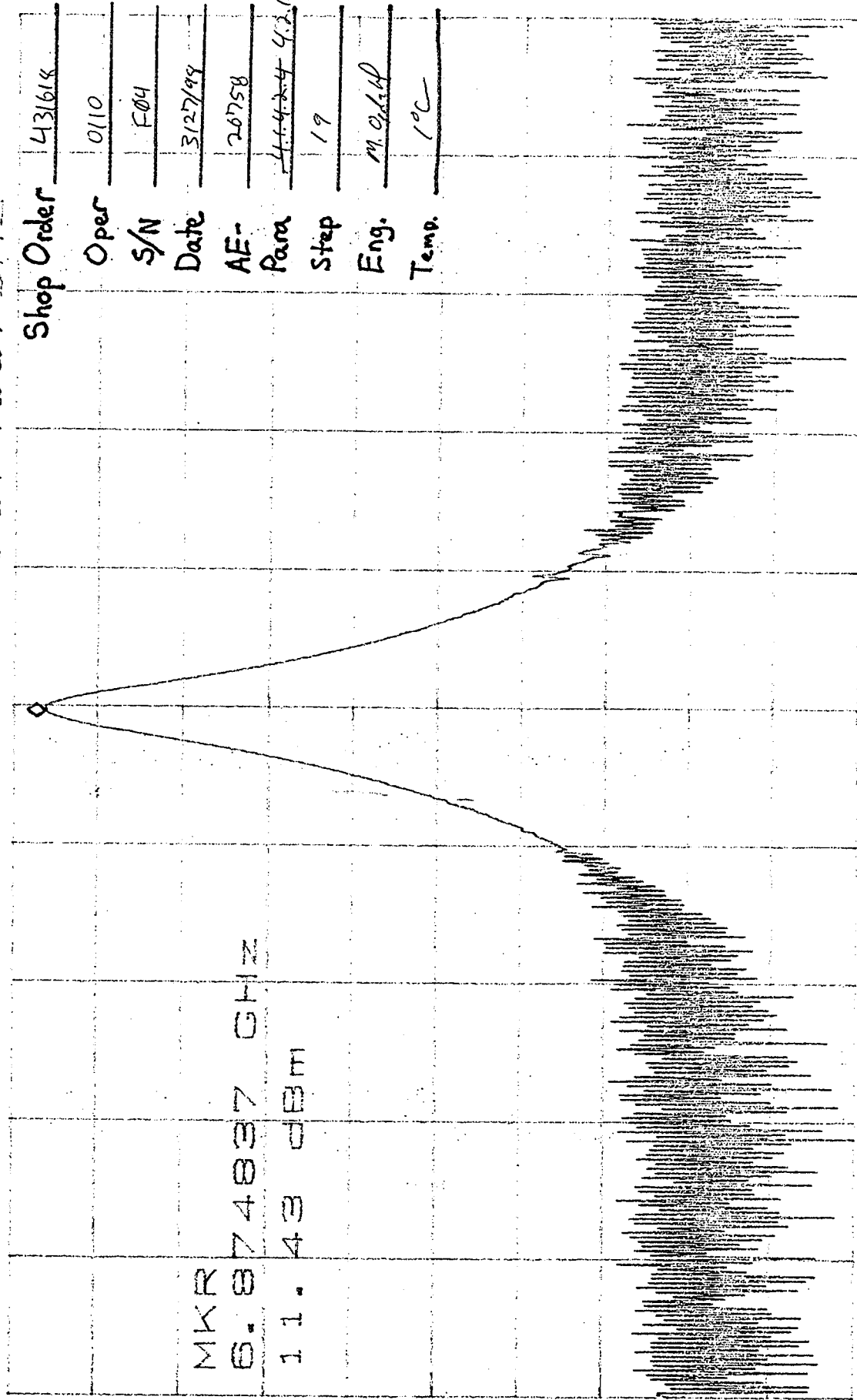
CENTER 57.29034GHz

*RBW 300kHz VBW 300kHz SWP 50.0ms

ATTEN 30dB
RL 15.1dB

MKR 11.43GHz
S. 874837CH

10dB



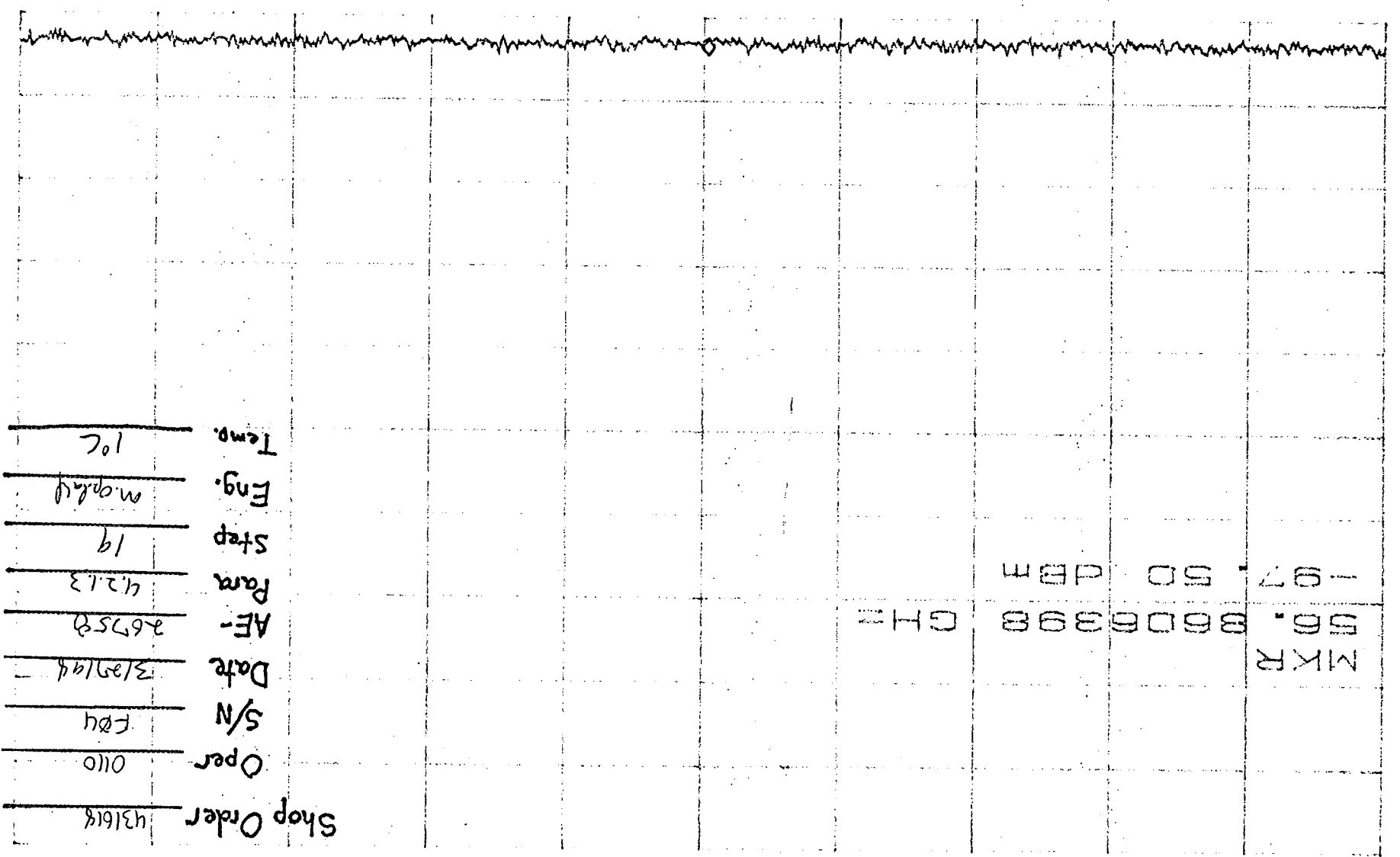
MKR 11.43GHz
S. 874837CH

CENTER 11.43GHz
SPAN 2.000MHz

SWP 50.0dB

W

CL 30.0dB VAVS 47 10dB/ 56.8606398GHz
 MKR -97.50dB



CENTER 56.8606415GHz
 SPAN 500.0KHz
 *RBW 3.0KHz *VBW 1.0KHz
 SWP 420ms

Shop Order 43164
 Oper 0110
 S/N F04
 Date 3/29/94
 AF- 26750
 Para 4213
 Step 19
 Eng. M. G. L. V.
 Temp. 10C



CL 30.0dB

VAVG 20

MKR -96.17dBm

RL 0dBm

10dB/

57.0038656GHz

Shop Order 431614

Oper 0110

S/N F04

Date 3/27/96

AE- 26758

Para 4.2.1.3

Step 19

Eng. M. Opden

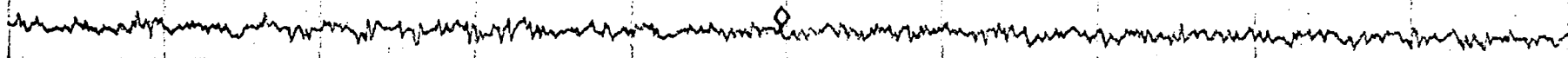
Temp. 1°C

MKR

57.0038656 GHz

-96.17 dBm

D



CENTER 57.0038673GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 1.0KHz

SWP 420ms

CL 30.0dB

VAVG 16

MKR -96.67dBm

RL 0dBm

10dB/

57.1470914GHz

Shop Order 431618

Oper 0110

S/N F04

Date 3/27/98

AE- 26758

Para 4.2.1.3

Step 19

Eng. M. Opland

Temp. 10C

MKR
57.1470914 GHz
-96.67 dBm

D

CENTER 57.1470931GHz

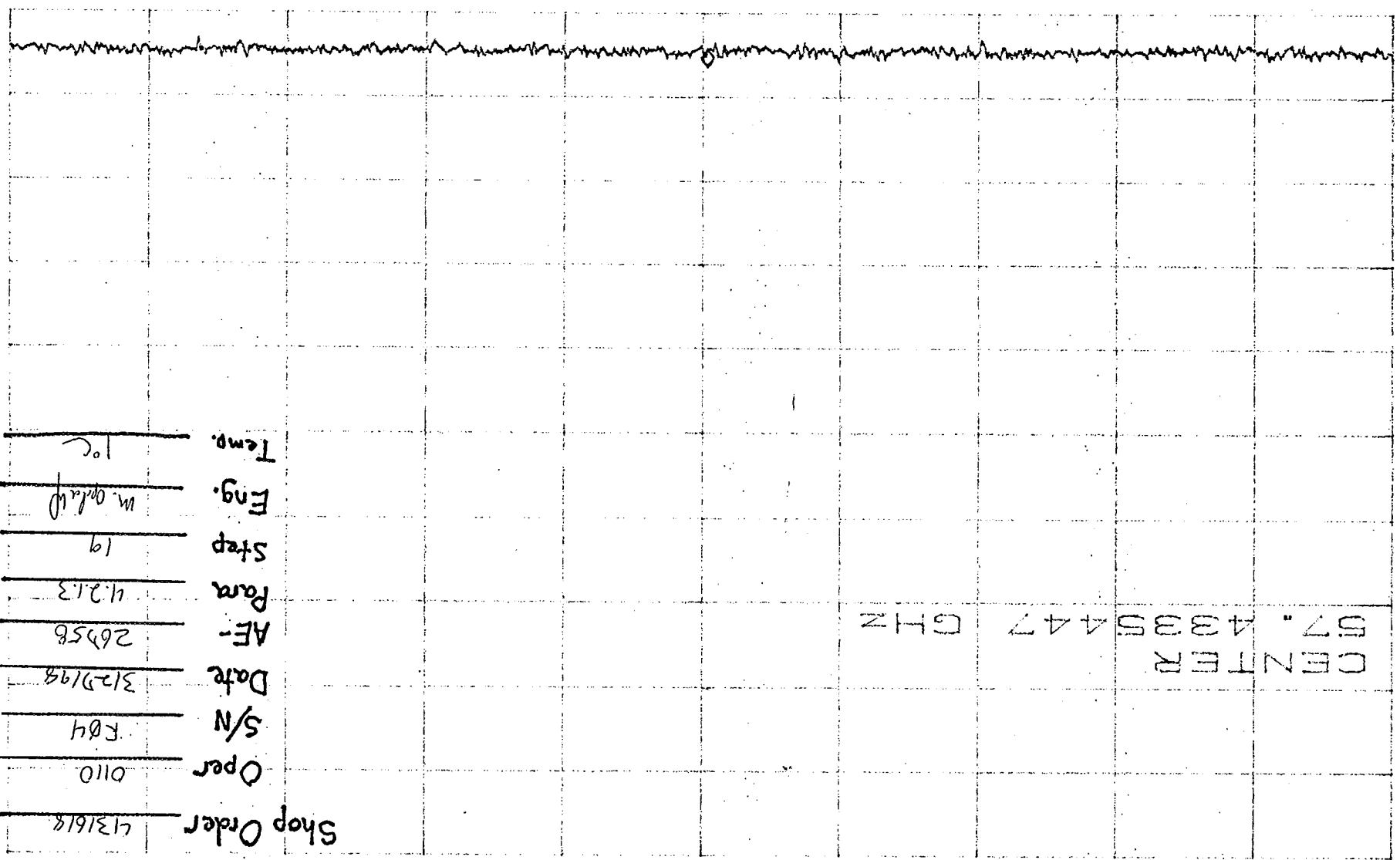
SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

CL 30.0dB VAVG 21 MKR -95.67dBm
RL 0dBm 10dB/ 57.4335430GHz

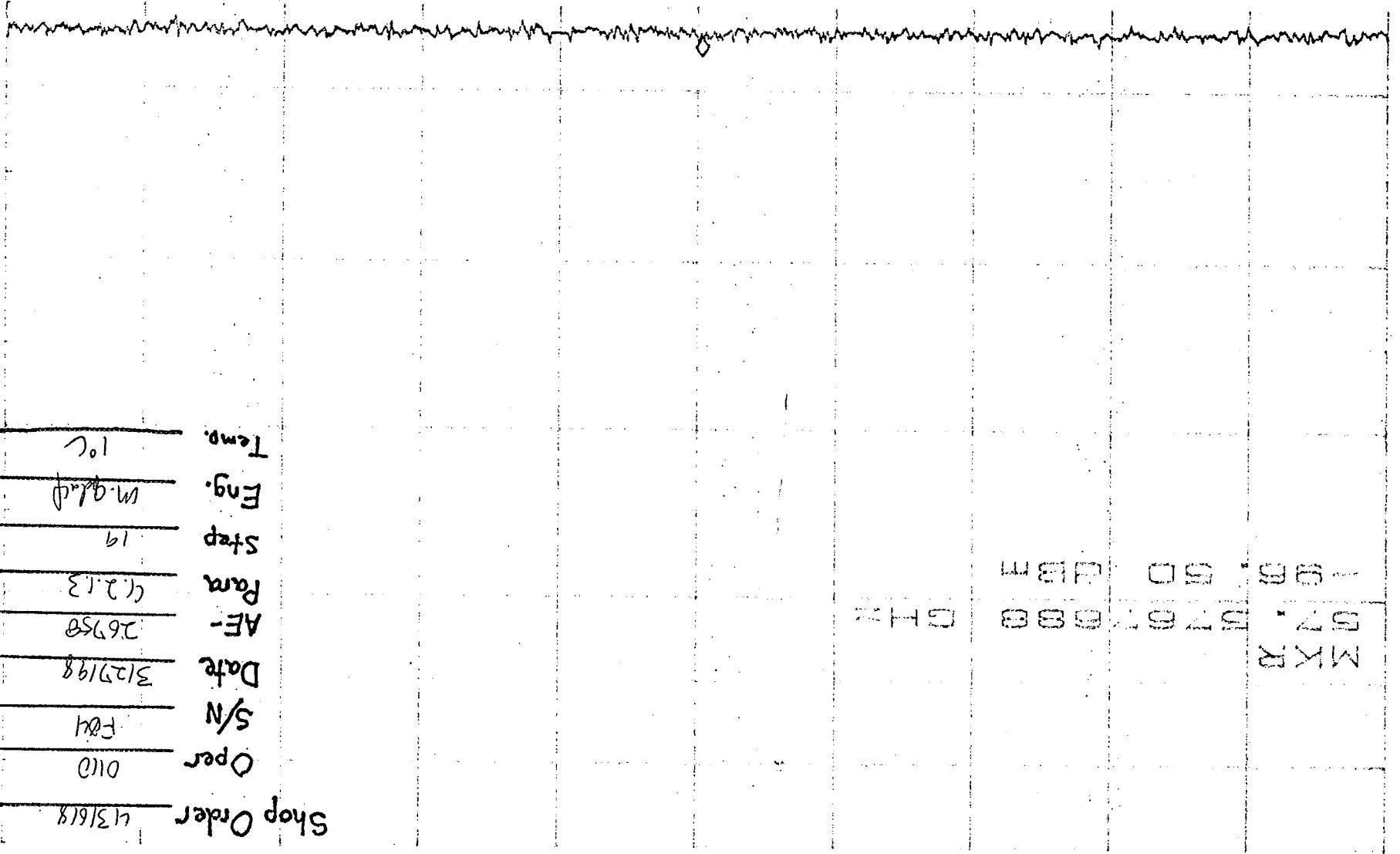


Shop Order 431618
Oper 0110
S/N F04
Date 3/27/98
AF- 26956
Para 4.2.1.3
Step 19
Eng. M. G. K. W.
Temp. 1°C

CENTER 57.4335447GHz SPAN 500.0KHz
*RBW 3.0KHz *VBW 1.0KHz SWP 420ms

CL 30.0dB VAVC 29 MKR -98.50dBm
 RL 0dBm 10dBV 57.5767688GHz

MKR
 57.5767688
 -98.50 dBm

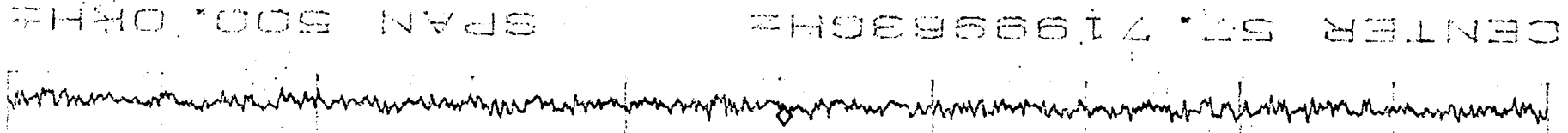


CENTER 57.5767688GHz SPAN 500.0kHz
 *RBW 3.0kHz *VBW 1.0kHz SWP 420MHz

Shop Order 431618
 Oper 0110
 S/N F04
 Date 3/27/98
 AF- 26758
 Para 4.2.13
 Step 19
 Eng. M. G. L. J.
 Temp. 1°C

CL 30.0dB VAVS 13 MKR -97.00dBm
RL 0dBm 10dBx 57.7199946GHz

CENTER 57.7199963 GHz



CENTER 57.7199963GHz SPAN 500.0KHz
*RBW 3.0KHz *VBW 1.0KHz SWP 420MHz

Shop Order 431618
Oper 0110
S/N F84
Date 3/27/98
AF- 26758
Pam 4.213
Step 19
Eng. M. Galy
Temp. 10C

L 30.0dB

RL 0dBm

10dB

MKR -74.67dBm

114.580650GHz

MKR

114.580650

GHz

-74.67 dBm

Shop Order

431618

Oper

0110

S/N

E64

Date

3/27/98

AF

4.213

Param

4.213

Step

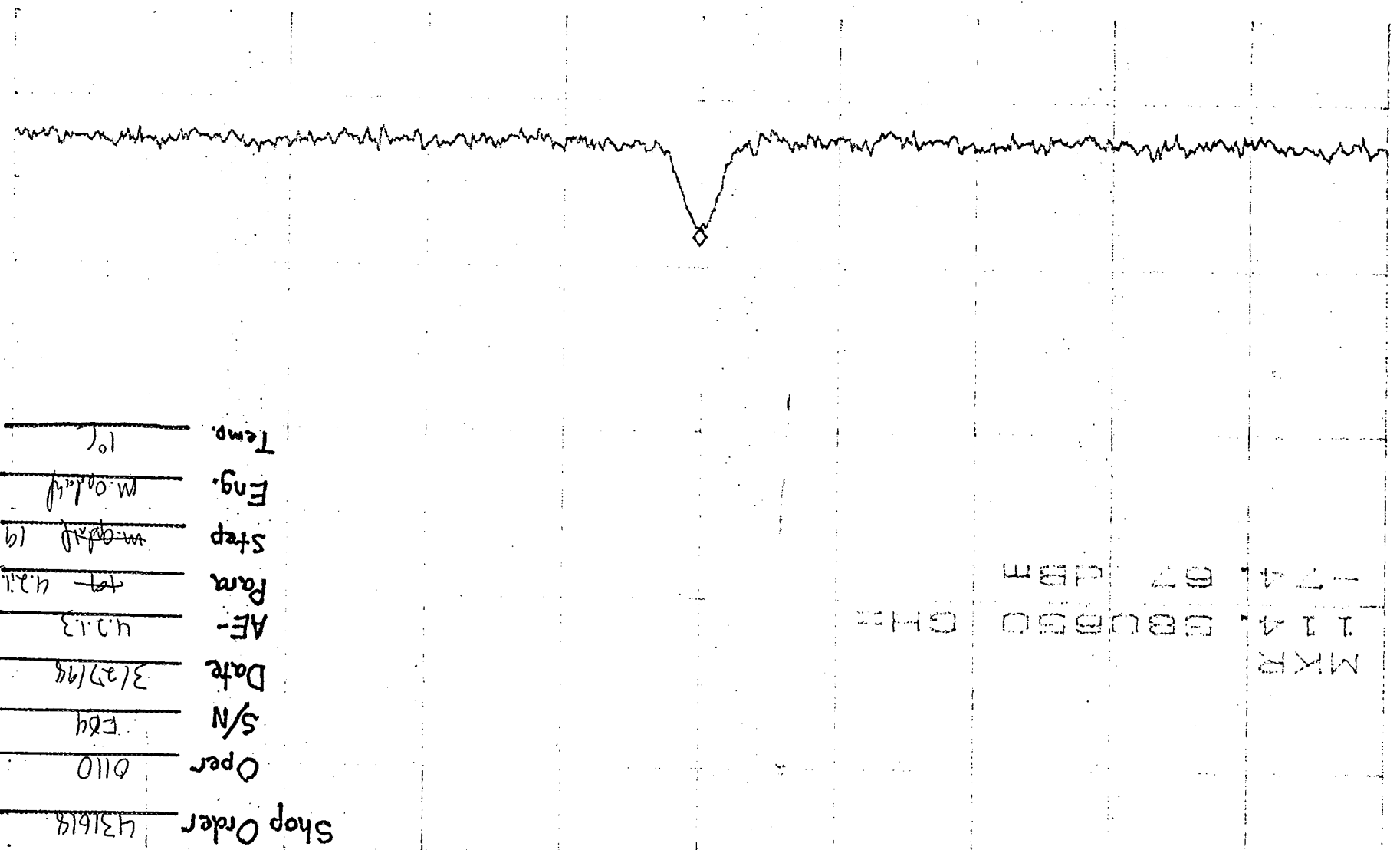
4.213

Eng.

M.0.141

Temp.

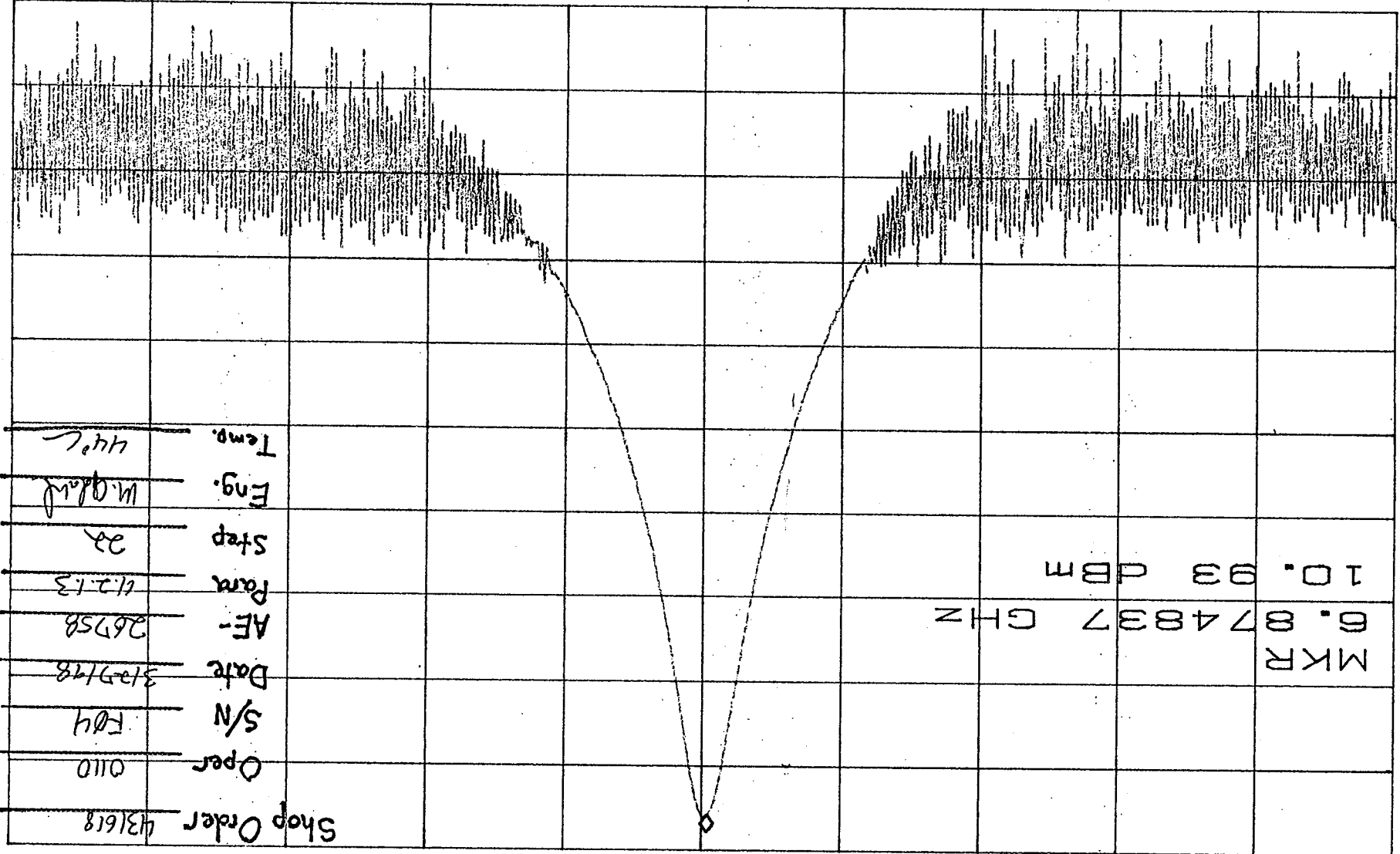
10



CENTER 114.580650GHz
SPAN 5.000MHz
*RBW 100kHz *VBW 1.0kHz
SMP 130MHz

MAR 27 98
130

ATTEN 30dB
RL 15.1dBm
MKR 10.93dBm
6.874837GHz



CENTER 6.874837GHz
SPAN 2.000MHz
RBW 30kHz
VBW 30kHz
SMP 50.0ms

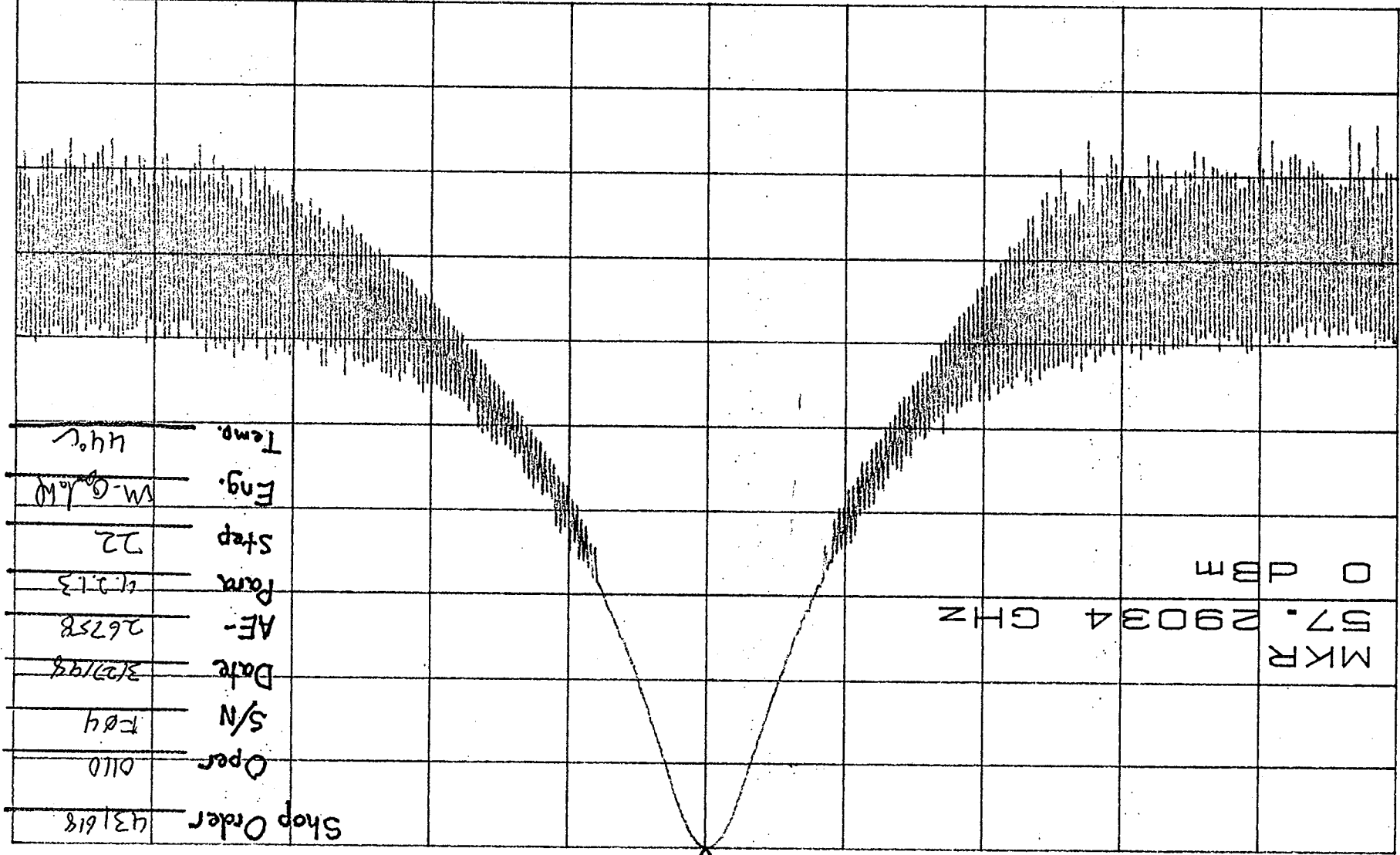
W

L 30.0dB

RL 0dBm

10dB/ 57.29034GHZ

MKR 0dBm



Shop Order 431618
 Oper 0110
 S/N F04
 Date 3/27/98
 AF- 26758
 Para 4.2.13
 Step 22
 Eng. M-G.10
 Temp. 44°C

CENTER 57.29034GHZ
 SPAN 10.00MHZ
 *RBW 300KHZ VBW 300KHZ SVP 50.0ms

MKR -96.00dBm

56. 8606500GHz

[illegible]

CENTER 56.8606500GHz

SPAN 500.0KHz

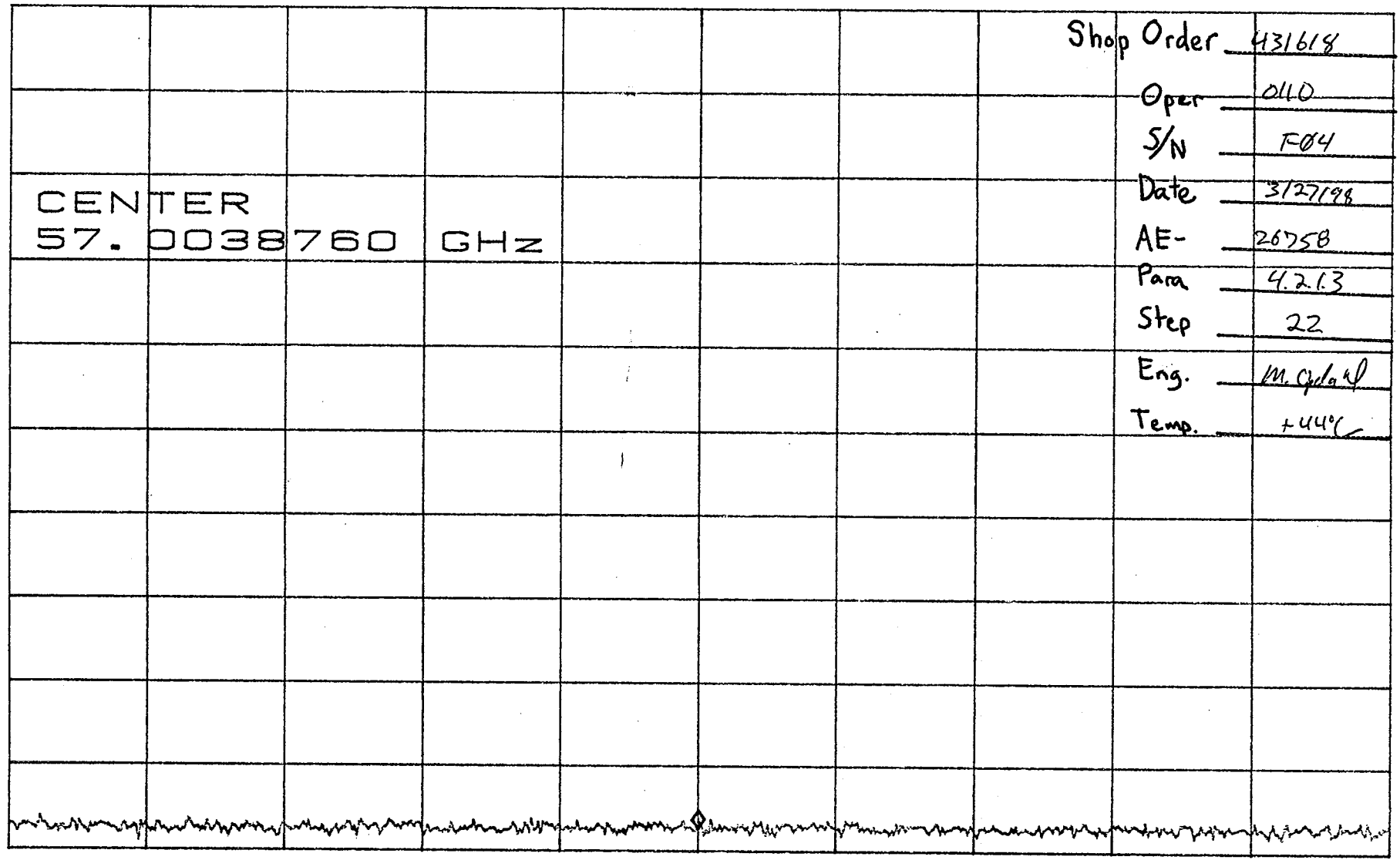
*RBW 3.0KHz

```
*VBW 1.0kHz
```

SWP 420ms

CL 30.0dB VAVG 100 MKR -97.17dBm
RL 0dBm 10dB/ 57.0038760GHz

D



CENTER 57.0038760GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 1.0kHz SWP 420ms

CL 30.0dB
RL 0dBm

VAVG 35
10dB/

MKR -96.33dBm
57.4335530GHz

D

MKR
57.4335530 GHz
-96.33 dBm

Shop Order	431618
Oper	0110
S/N	F04
Date	3/27/98
AE-	26758
Para	4.2.1.3
Step	22
Eng.	M. Opl. 41
Temp.	44°C

CENTER 57.4335530GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

MAR 27 98 7A 190

CL 30.0dB

VAVG 38

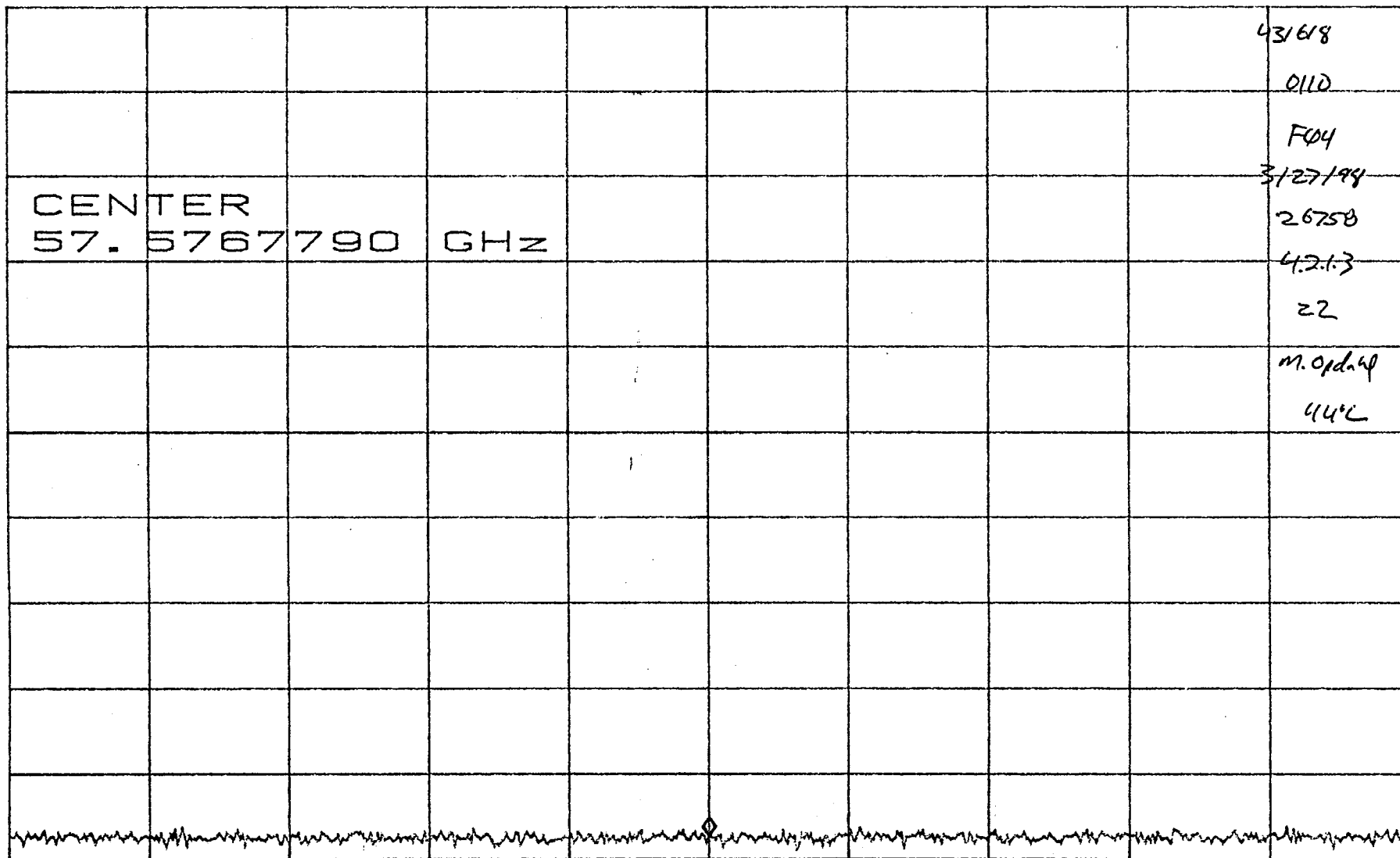
MKR -97.17dBm

RL 0dBm

10dB/

57.5767790GHz

D



CENTER 57.5767790GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 1.0kHz

SWP 420ms

Shop Order	431619
Oper	0110
S/N	F04
Date	5/27/98
AE-	26758
Par	4.2.13
Step	22
Eng.	M-0414
Temp.	44°C

CENTER

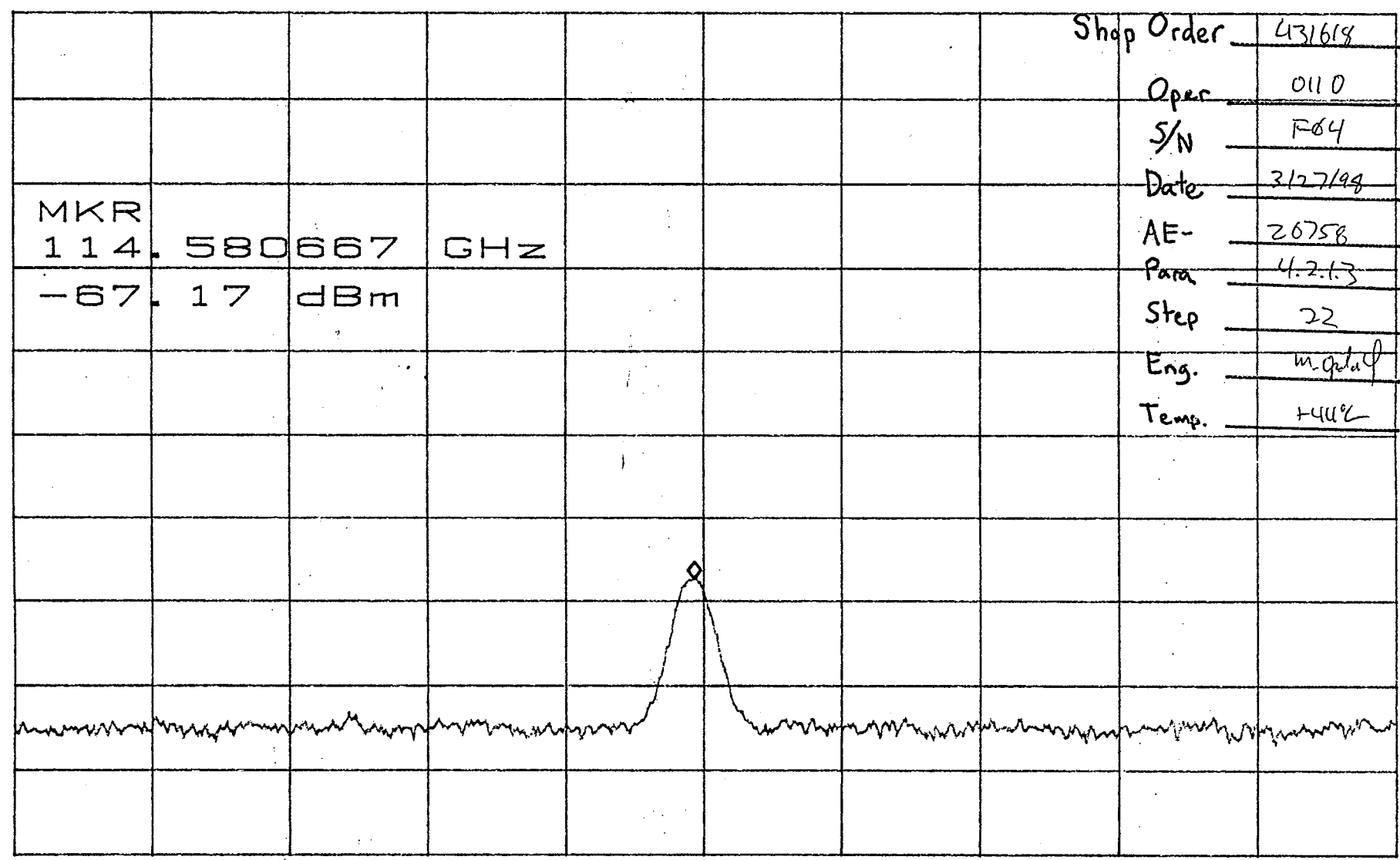
57.719963 CHZ

CL	30.0dB	VAVG	17	MKR	-97.67dBm
RL	0dBm		10dB/		57.719963GHz

L 30.0dB
RL 0dBm

10dB/

MKR -67.17dBm
114.580667GHz



CENTER 114.580700GHz SPAN 5.000MHz
*RBW 100kHz *VBW 1.0kHz SWP 130ms

Section 2A: Vibration - F03

Following is the data taken after acceptance level vibration testing for PLO SN F03.

Test	Expected Value	Post X axis	Post Y axis	Post Z axis
Output Frequency	57.290344 GHz \pm 200 kHz	57.290327 GHz	57.290329 GHz	57.290330 GHz
Output Power	18.5 dBm \pm 1.5 dB	19.13	19.21	19.21

Both the frequency span of 300 Hz and the power difference of 0.08 dB are considered to be changes not brought about by vibration stresses, but rather from experimental error.

The following pages contain the raw data further describing the test and the results for the tests on PLO F03.

SHEET 27 OF 34
FOR NO. 1675

AE-26758A
21 Jan 98

TEST DATA SHEET 8A
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: STBT Pass
Signature: Mark [Signature] Pre-environmental LPT at Room Temperature
Pre-vibration

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	Not used N/A*
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.005 VAC Pass
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.004 VAC Pass

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	+15.0 V	Pass
	Voltage Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max.	518 mA	Pass
	Current Meter 2	100 mA max. <u>0.002 GHz</u>	66 mA	Pass
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290 329 940 GHz	Pass
10	Output Power	18.5 dBm ± 1.5 dB	18.9 dBm	Pass

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

Shop Order No.: 431615
operation.: 0132
Unit Serial No.: F03
Date: 4.3.98

Test Engineer: Mark [Signature]
Quality Assurance: Central [Signature] Govt Rep [Signature] 4/3/98
DCMC: [Signature]

TEST DATA SHEET 8
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Hail
Signature

Paragraph 4.2.3.2:

Step	Test		Required	Measurement	Pass/Fail
3	Potential Difference				
	From	To			
	Power Supply RTN	Test Platform *	< 1.0 Vac		N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	.09 mV	P
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	.09 mV	P

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.99 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.00 V	P
	Current Meter 1	600 mA max.	517 mA	P
	Current Meter 2	100 mA max.	66.23 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290327 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.13 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"X" AXIS

Shop Order No.: 431615
Unit Serial No.: F03
Date: 4/7/98

Test Engineer: R. Hail
Quality Assurance: 4/7/98
DCMC: 4/7/98

21 Jan 98

TEST DATA SHEET 8

Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Haifl
Signature

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	P
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	P

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.99 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.03 V	P
	Current Meter 1	600 mA max.	517 mA	P
	Current Meter 2	100 mA max.	66.2 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290329 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.21 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"Y" AXIS

Shop Order No.: 431615

Unit Serial No.: F03

Date: 4/7/98

Test Engineer: R. Haifl

Quality Assurance: 4/7/98

DCMC: 4/7/98

TEST DATA SHEET 8
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Hail
Signature

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	.11X P
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	.26X P

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.79 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.03 V	P
	Current Meter 1	600 mA max.	516 mA	P
	Current Meter 2	100 mA max.	66.17 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290330 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.21 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"Z" AXIS

Shop Order No.: 431615

Unit Serial No.: F03

Date: 4/7/98

Test Engineer: R. Hail

Quality Assurance: 7A 190 4/7/98

DCMC: 4/7/98

TO: D. R. Pines **DATE:** 08 - Apr -1998
FROM: R. J. Heffner plovibtest3#279.doc
170:8611:98#279
SUBJECT: AMSU-A Phase Lock Oscillator (PLO) Acceptance Vibration Testing of P/N 1348360-1, S/N's F03 and F04
COPIES TO: D. F. Brown, R. V. Hauerwaas, L.T. Paliwoda, P. K. Patel, S. W. Reynolds, D.L. Tran, Writer, File

REFERENCES:

1. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator Qualification/Acceptance Vibration Testing Procedure", Rev. 3, OC-426, March 1998.
2. "PLO Assembly", Dwg. 1348360.
3. "Receiver Assembly A1-1", Dwg. 1356429.
4. "Shelf Assy, RF, Lower", Dwg. 1331555.
5. "AMSU-A Phase Lock Oscillator (PLO) Acceptance Vibration Testing of P/N 1348360-1, S/N F02", IOM 170:8611:#1291, 9 Dec. 1997.
6. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator, P/N 1348360-1, S/N F03, Mfg. S/O 431615.
7. "Environmental Requirements AMSU-A Instrument Components", AE-26578B, 16 March 1995.
8. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator, P/N 1348360-1, S/N F04, Mfg. S/O 431618.

PURPOSE

The purpose of this memo is to present a summary of the acceptance level vibration testing performed on the AMSU-A P/N 1348360-1 S/N's F03 and F04 PLO's on April 7, 1998.

SUMMARY

The AMSU-A P/N 1348360-1 S/N's F03 and F04 PLOs were successfully tested to acceptance level component random vibration loads per the Ref. 1 procedure. Test level was at 13.6 Grms. Before and after each axis of random vibration, low level sine sweeps were run to verify structural integrity of the component assembly. In addition, an electrical functional test

was performed, successfully, after each random vibration test axis. Maximum response of the single triaxial response accelerometer mounted on the PLL/TCXO Assembly occurred for (1) S/N F03 at the METSAT Y-Axis test, with Y-Axis response of 47.303 Grms, and (2) . Maximum peak 3σ load, for the METSAT Y-Axis test at $1^{st} f_n$ of approximately 1026 Hz is estimated at 56.9 g.

RESULTS

The Ref. 2 S/N F03 instrument was mounted per Ref. 1, Figure 5, "Test Fixture Axis Orientation". Using METSAT orientation, the X-Axis was tested first, with a 0.25 g 20-2000 Hz pre-random sine sweep, the 13.6 Grms random, and a 0.25 g 20-2000 Hz post-random sine sweep all run, followed by an electrical functional test. Subsequently, Z-Axis and Y-Axis test sequences were also run. The same sequence of tests was run for Ref. 2 S/N f04. In all instances the pre-random and post-random sine sweeps showed no changes in the frequency responses before and after the random tests. Of greater significance, each electrical function test, run after each test axis vibration sequence, was successful.

Table 1 summarizes the responses recorded per the control accelerometer and the triaxial response accelerometer for S/N F03. Listed are total Grms responses along with an estimate of the peak 3σ response at 1^{st} resonance, determined per half-power point method. Table 2 summarizes the same information for S/N F04.

The results of Table 1 compare to the Ref. 5, Table 1 values. However, there are some differences, which are probably due to (1) different units, and (2) different locations of the response accelerometers (see Ref. 1 and 5). For S/N F01, the response accelerometer was mounted on the +Sun side of the upper PLO assembly (on the PLL assembly). For S/N F02, the response accelerometer was moved to the +Velocity side of the upper PLO (PLL) assembly. The difference in stiffness of the mounts may have contributed to the response differences.

Note that this test continued using #6 mounting screws attaching the unit to the fixture adapter plate (see Ref. 5 discussion).

Table 1 Analysis of S/N F03 Random Vibration Data

X-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.590					
X-Response	18.456	864	903	0.51	4.46	13.4
Y-Response	10.292	886	931	1.0	6.71	20.1
Z-Response	9.652	886	920	0.21	2.67	8.0

Z-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.533					
X-Response	13.898	1055	1079	1.75	6.48	19.4
Y-Response	7.147	1056	1088	0.72	4.8	14.4
Z-Response	30.320	1035	1068	2.1	8.32	25.0

Y-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.521					
X-Response	21.303	1027	1054	4.0	10.39	31.2
Y-Response	44.408	1022	1054	6.0	13.86	41.6
Z-Response	10.896	1022	1054	0.49	3.96	11.9

Table 2 Analysis of S/N F04 Random Vibration Data

X-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.513					
X-Response	21.552	875	894	0.60	3.38	10.1
Y-Response	11.190	881	914	2.0	8.12	24.4
Z-Response	16.889	891	914	0.11	1.59	4.8

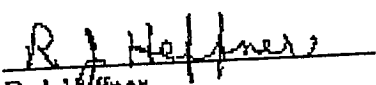
Z-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.552					19.9
X-Response	15.001	1038	1064	1.7	6.65	15.4
Y-Response	7.591	1041	1064	1.15	5.14	24.7
Z-Response	31.371	1035	1068	2.05	8.22	

Y-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.522					42.2
X-Response	21.257	1003	1041	5.2	14.06	56.9
Y-Response	47.303	1011	1041	12	18.97	8.4
Z-Response	6.285	1041	1101	0.13	2.79	

Figures 1-3 are S/N F03 plots of the in-axis responses for random vibration for the PLO for each of the three test axes. A complete set of vibration data, including all sine sweep data, is included with the Ref. 6 shop order. Figures 4-6 are S/N F04 plots of the in-axis responses for random vibration for the PLO for each of the three test axes. A complete set of vibration data, including all sine sweep data, is included with the Ref. 8 shop order.

CONCLUSIONS and RECOMMENDATIONS

It is concluded that the S/N F03 and S/N F04 P/N 1348360-1 PLO's successfully passed the Ref. 7 AMSU-A Instrument Component Random Vibration Tests.

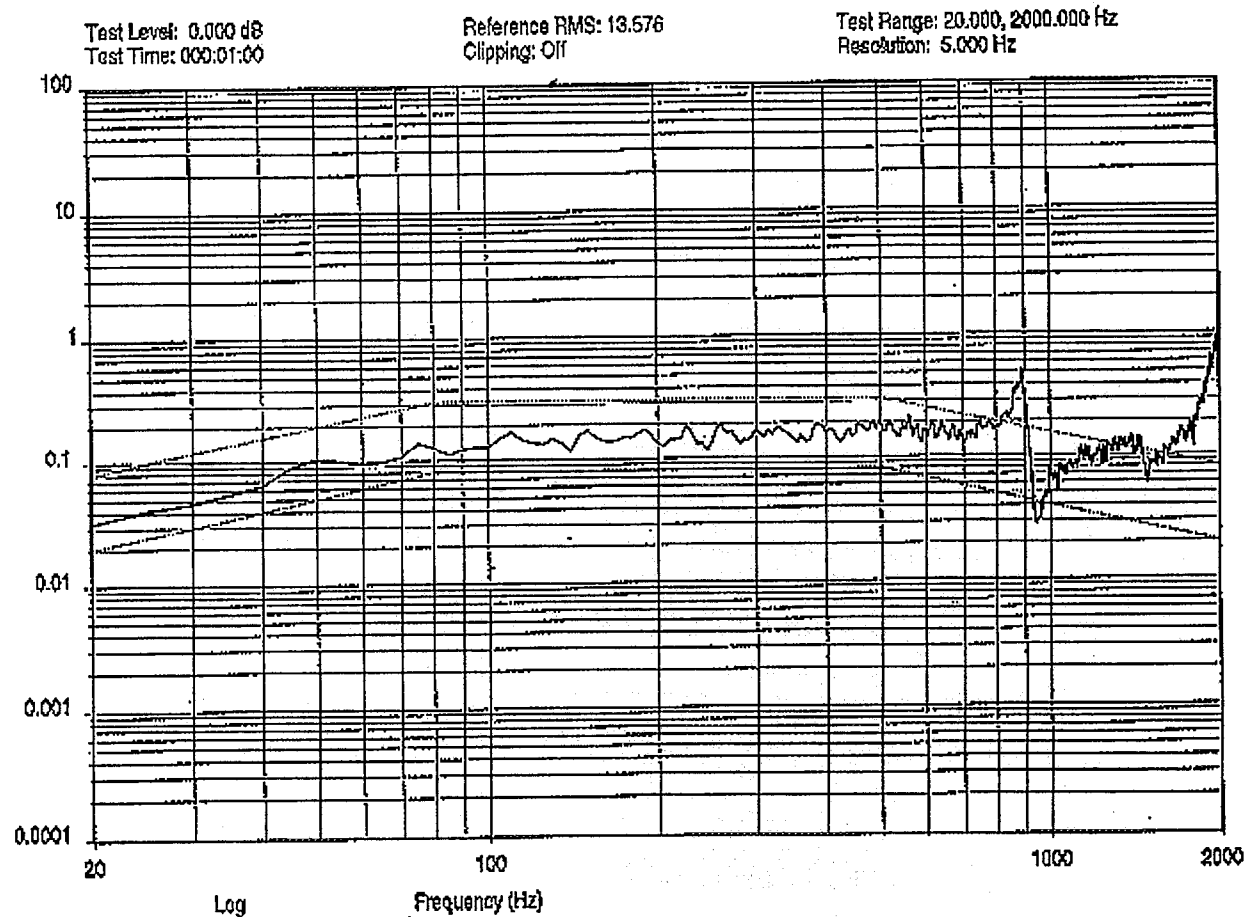

R. J. Helfner
Mechanical Design and Analysis

FILES: PC My Documents/amsua2/plovibtest3#274.doc

98%23279.doc

Auxiliary
Chan. 2

Log
g²/Hz
DOF 120
RMS:
18.456 g



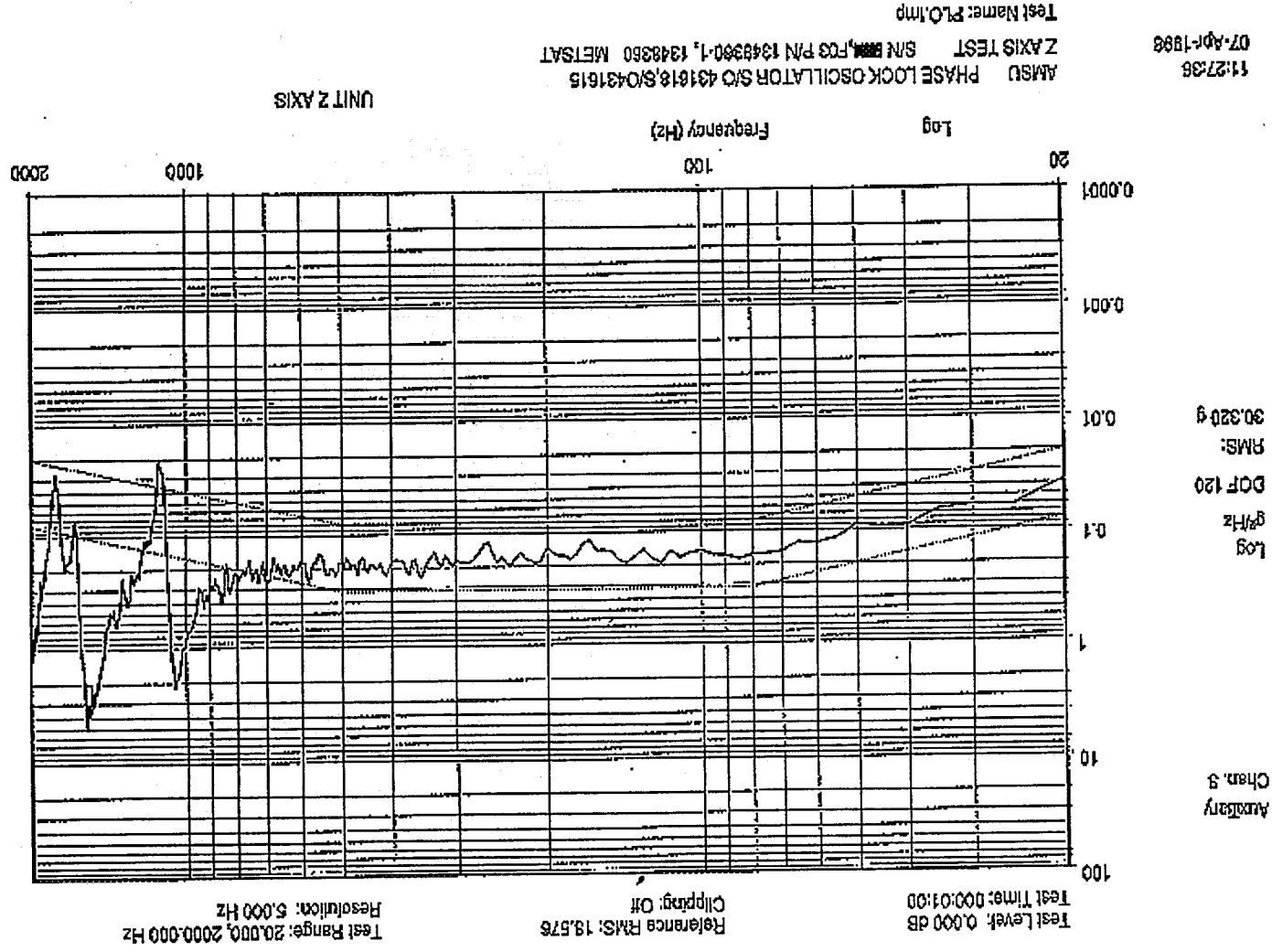
UNIT X AXIS

10:09:14
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618, S/O 431615
X AXIS TEST S/N 1348360-1, 1348360
Test Name: PLO.imp

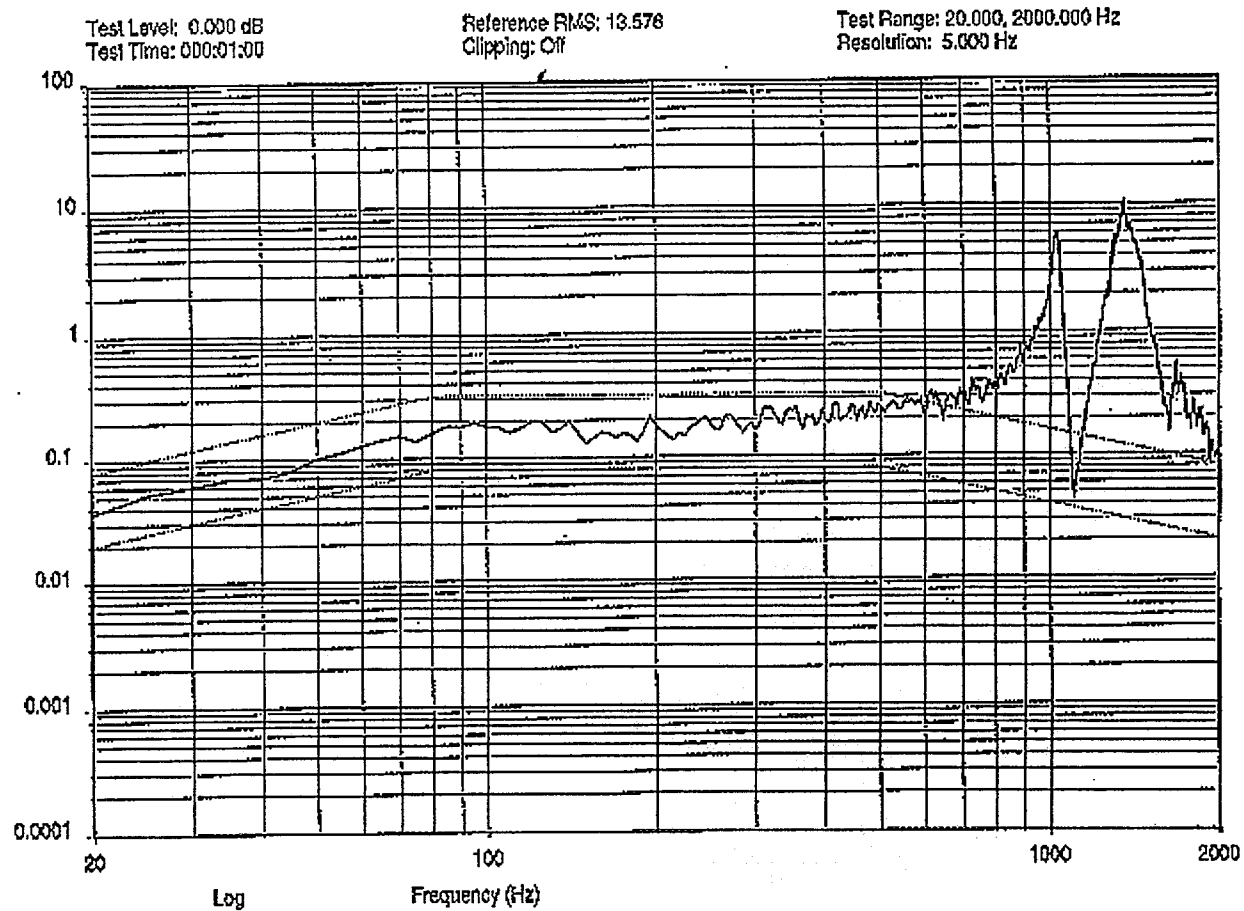
Figure 1

Figure 2



Auxiliary
Chan. 4

Log
g²/Hz
DOF 120
RMS:
44.048 g



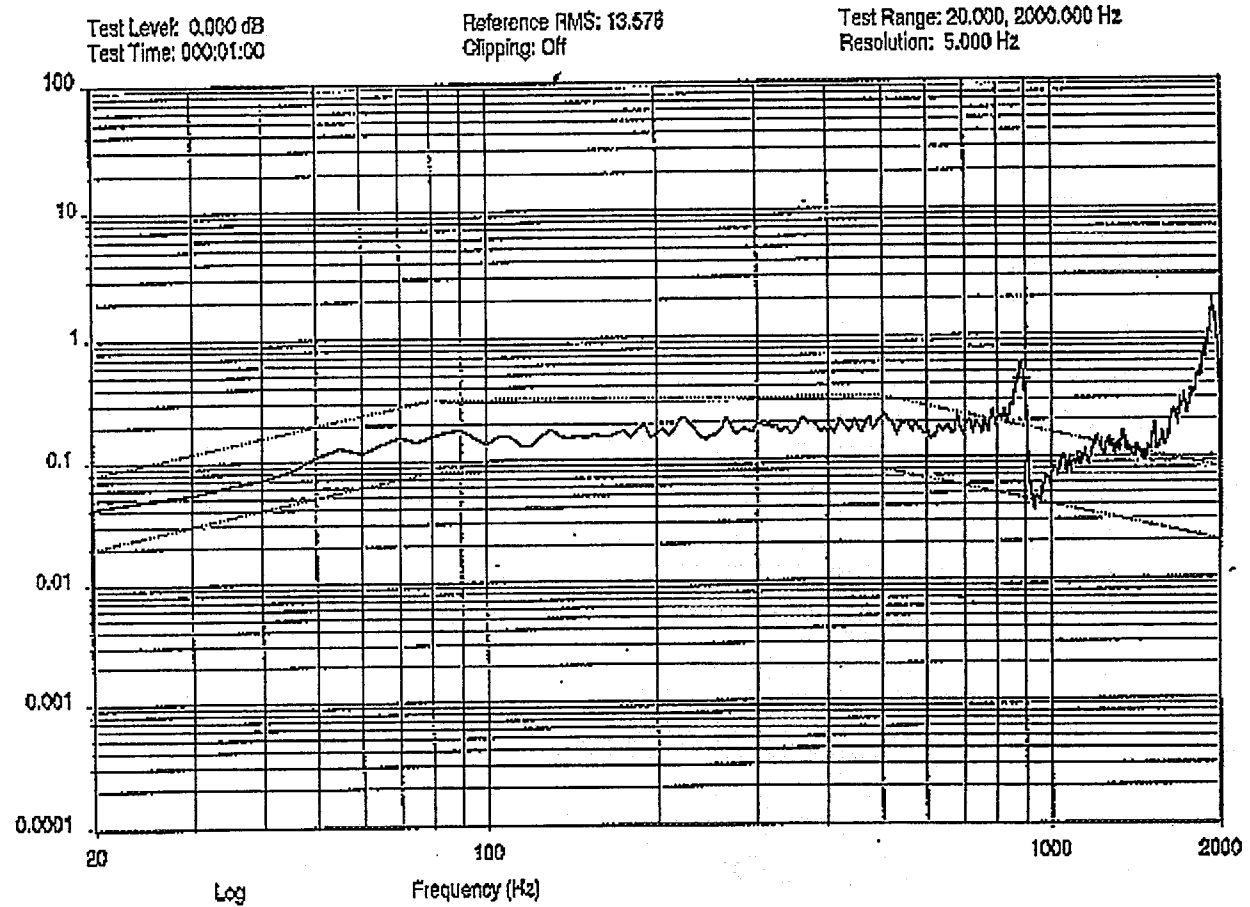
19:18:37
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O 431615
Y AXIS TEST S/N [REDACTED], P/N 1348360-1, 1348360 METSAT
Test Name: PLO.Imp

Figure 3

Auxiliary
Chan. 2

Log
g/Hz
DOF 120
RMS:
21.552 g



UNIT X AXIS

14:51:02
07-Apr-1998

AMBU PHASE LOCK OSCILLATOR S/D 431618
X AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

Figure 4

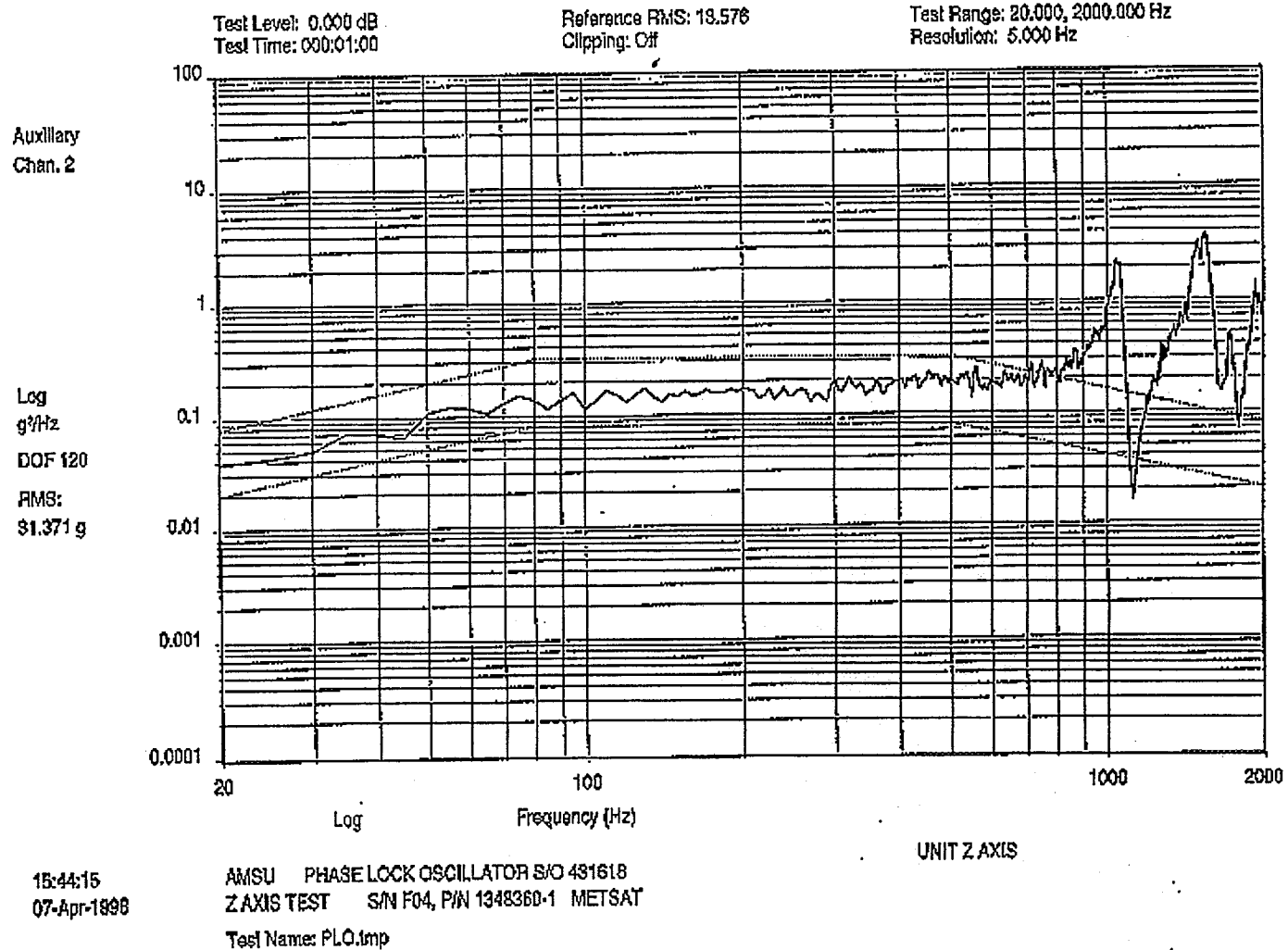
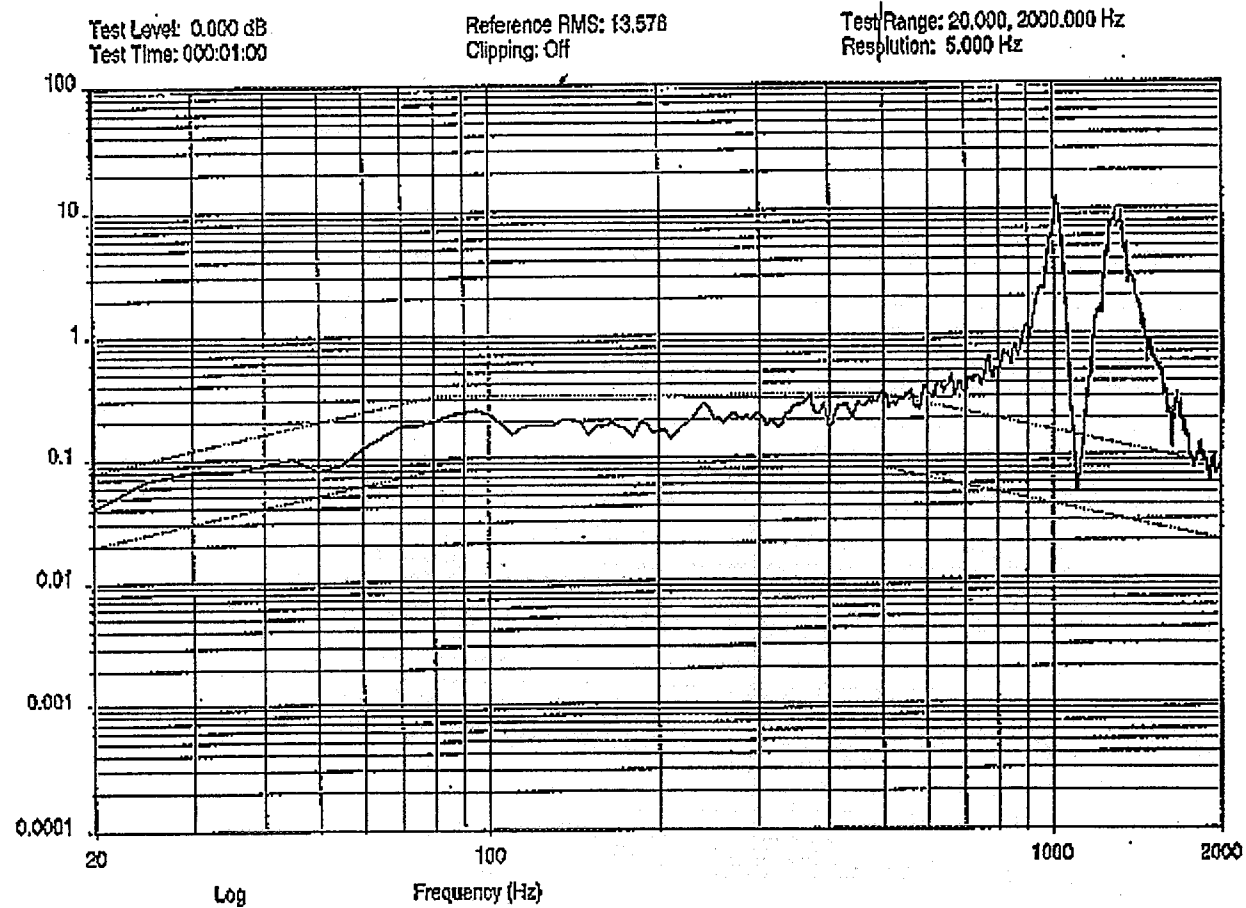


Figure 5

Auxiliary
Chan. 4

Log
g/Hz
DOF 120
RMS:
47.308 g



16:23:56
07-Apr-1988

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1848360-1 METSAT
Test Name: PLO.Imp

APR 07 1988
SNO
229/61
41

UNIT Y AXIS

Figure 6

4/7/98

AMSU-A
EOS/METSAT PLO
QUALIFICATION/ACCEPTANCE RANDOM VIBRATION TEST
DATA SHEET 1 (DS1)
TEST EQUIPMENT LOG

ITEM	Manufacturer	Model/ Part No.	Aerojet Inventory No	Calibration Date	Calibration Due Date
Gen Rad Vib Control	SUN	2550	55053	2/3/98	8/3/98
Shaker Amplifier	UNHOLTZ	SRP3A	54718-1	2/12/98	5/12/98
Tape Recorder	Metrum	RSR512	54445	5/19/97	8/19/98
Charge Amplifier	Endevco	2775A	7434339	11/15/97	11/15/98
Charge Amplifier	"	"	7434340	1/28/97	10/28/98
Charge Amplifier	"	"	7434347	1/29/97	4/29/98
Charge Amplifier	"	"	7434348	1/27/97	7/27/98
Charge Amplifier	"	"	7434342	1/29/97	10/29/98
Charge Amplifier	"	"	7434343	1/28/97	10/28/98
Accelerometer	Endevco	2271Amd	L606041	5/1/97	5/1/98
Accelerometer	"	"	L606043	5/1/97	5/1/98
Accelerometer	"	"	L606045	6/25/97	6/25/98
Accelerometer	"	35	L607073	10/2/97	1/2/99
Accelerometer	"	2271Amd	L606042	5/1/97	5/1/98
Accelerometer	"	9694M1	L606872	5/7/97	8/7/98
Vib Monitor Limiter	UNHOLTZ	AM123	54742	1/13/98	1/13/99
Vib Monitor Limiter	UNHOLTZ	"	54742	1/13/98	1/13/99
Fixture	Ling	25742	AT135894	N/A	N/A
Fixture	Ling	45269	AT135894	N/A	N/A
Torque Head	snopov	6006A	L507948	2/20/98	8/20/99

Signature/Date

Assembly Part No. 1348360

Engineer: D. J. Brown 4/7/98

Serial No. F04

Quality Control: APR 07 1998

Shop Order 431618

Operator: J. Tillman 4/7/98

431615 4/7/98

TEST DATA SHEET (DS2)
ACCELEROMETER AXIS VS. DATA
CHANNEL LOG

4/23/98
My 11
4/7/98
ENG
229

SHOP ORDER NUMBER 431615

Accelerometer P/N and S/N

Data Channel

Unit Axis

L606041

1

Control

L606872

2

X

11

3

Z

11

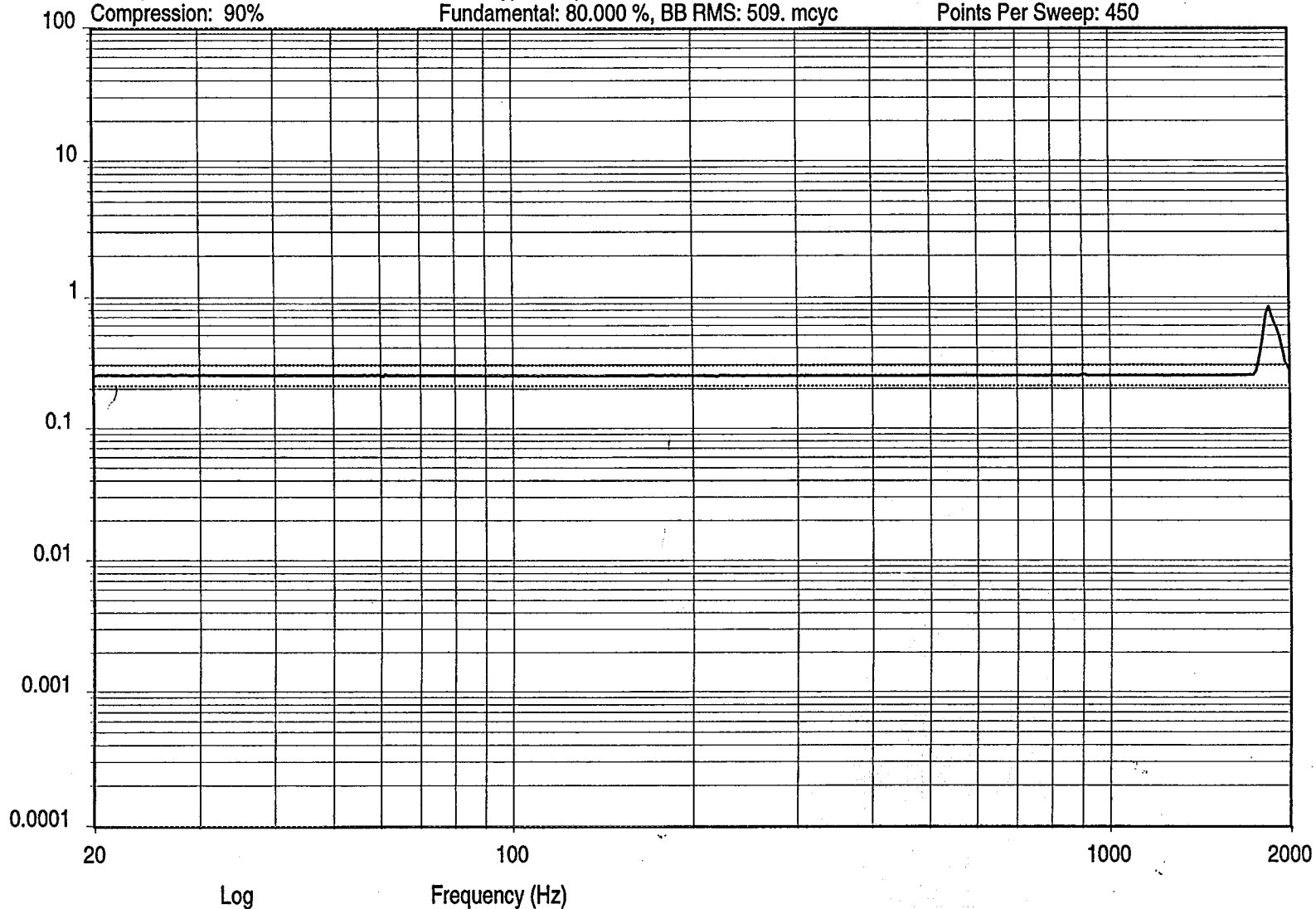
4

Y

Sweep Number: 1.00 Elapsed Time: 000:03:18 Remaining Time: 000:00:01
Sweep Rate 1: 2.000 oct/min Filter Type: Proportional Test Range: 20.000, 2000.000 Hz
Compression: 90% Fundamental: 80.000 %, BB RMS: 509. mcyc Points Per Sweep: 450

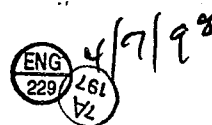
Control

Log
Acceleration
g (0-pk)



09:40:02
07-Apr-1998

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PRE X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



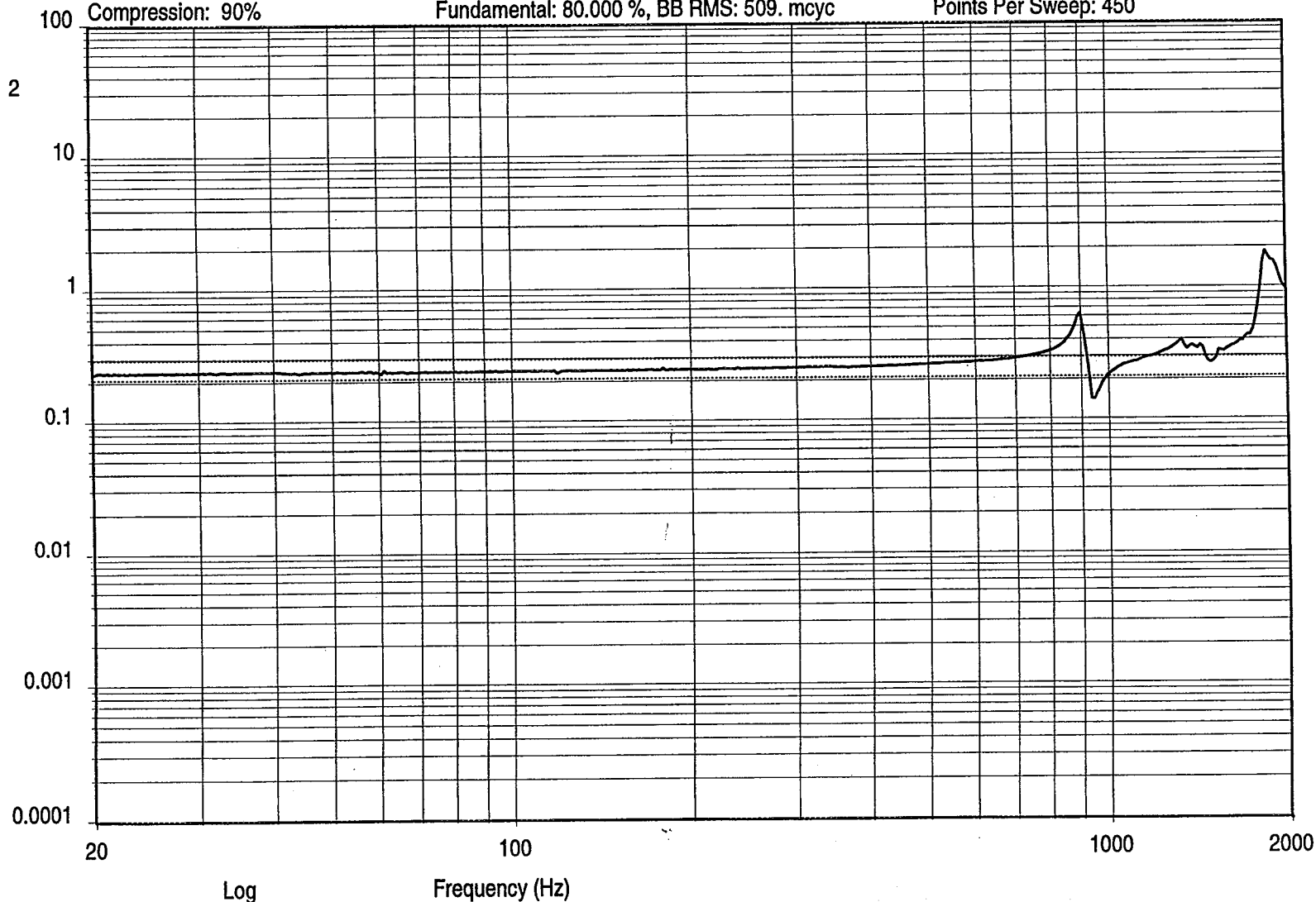
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Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)

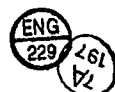


09:39:37
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998

X AXIS



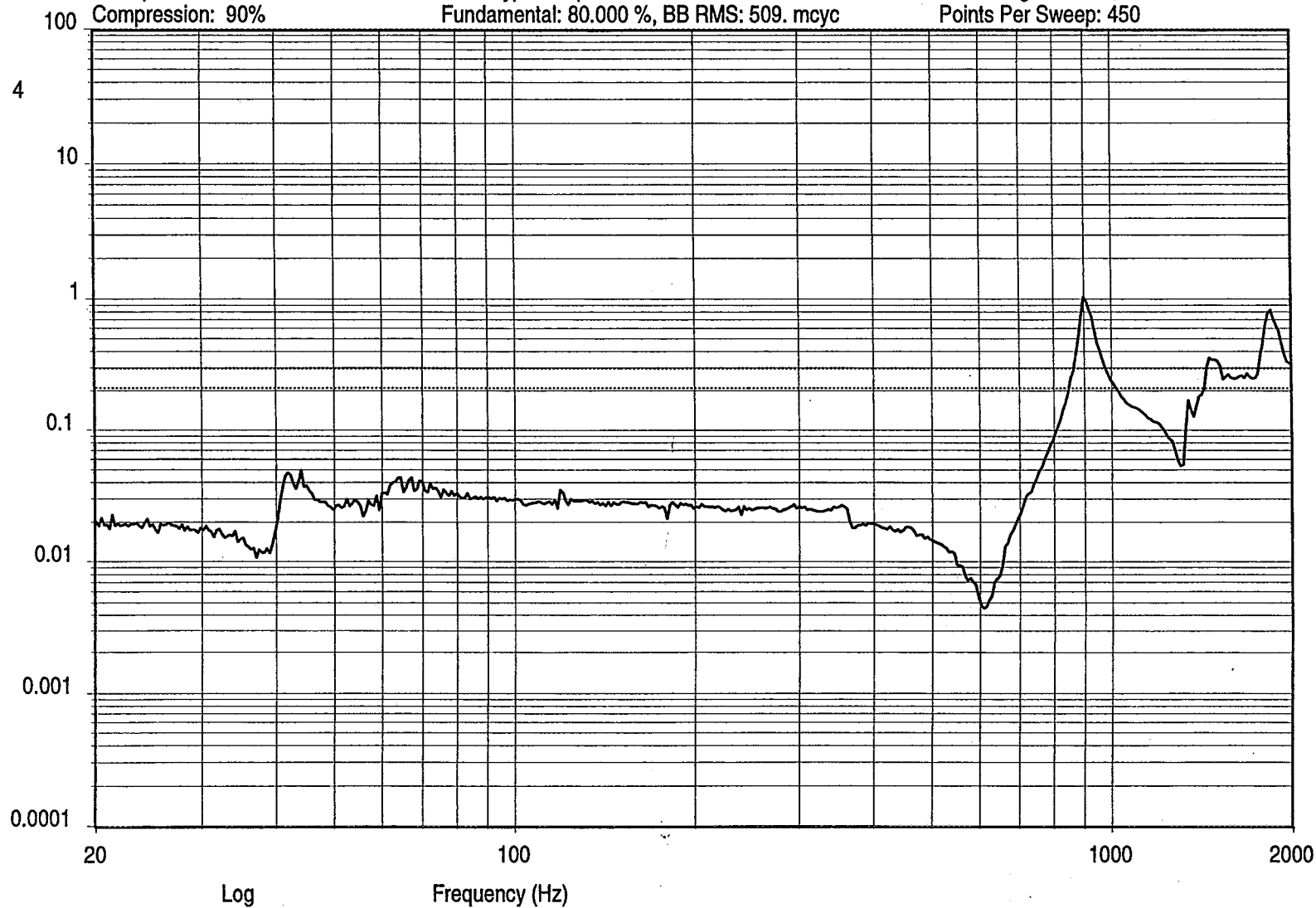
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Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



09:39:47
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998

Y AXIS



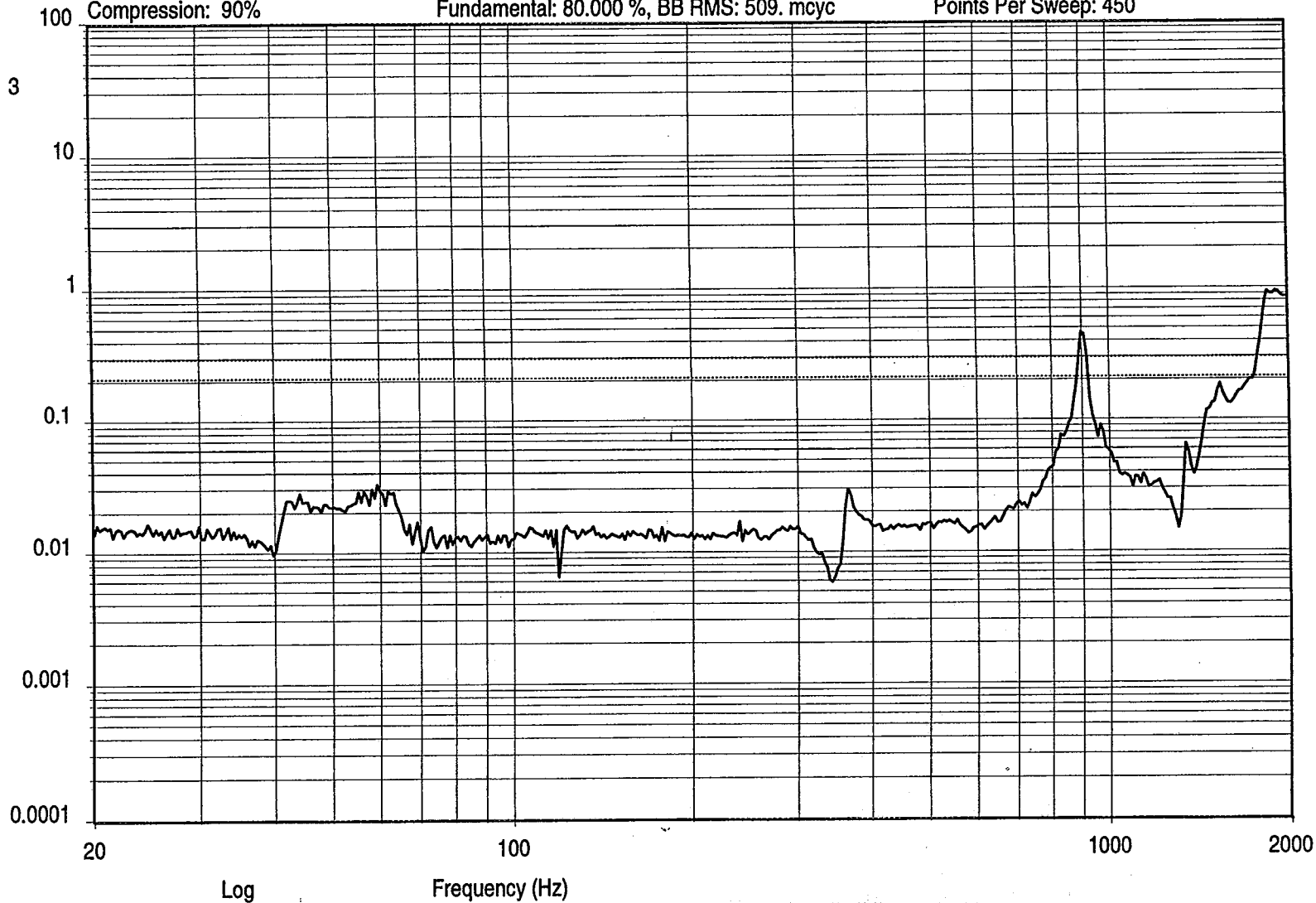
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Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



09:39:42
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

Z AXIS

ENG 229
APR 07 1998
161
VZ

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

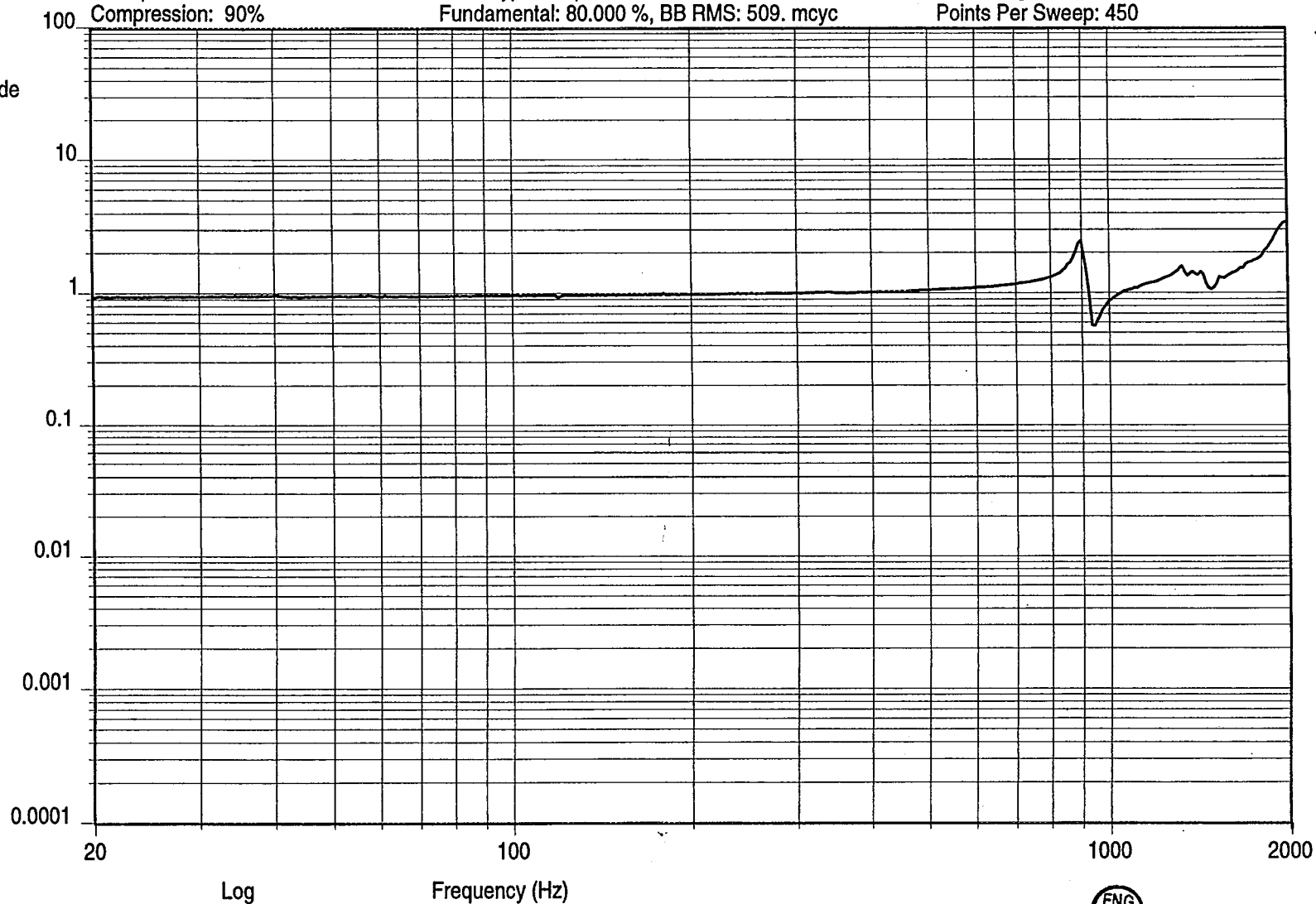
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Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log

Ratio



09:38:45
Tue Apr 07 1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Data Review Name: AMSU_A2.tmp

2/CONTROL

ENG
229

APR 07 1998

APR 07 1998
ENG 229
74

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

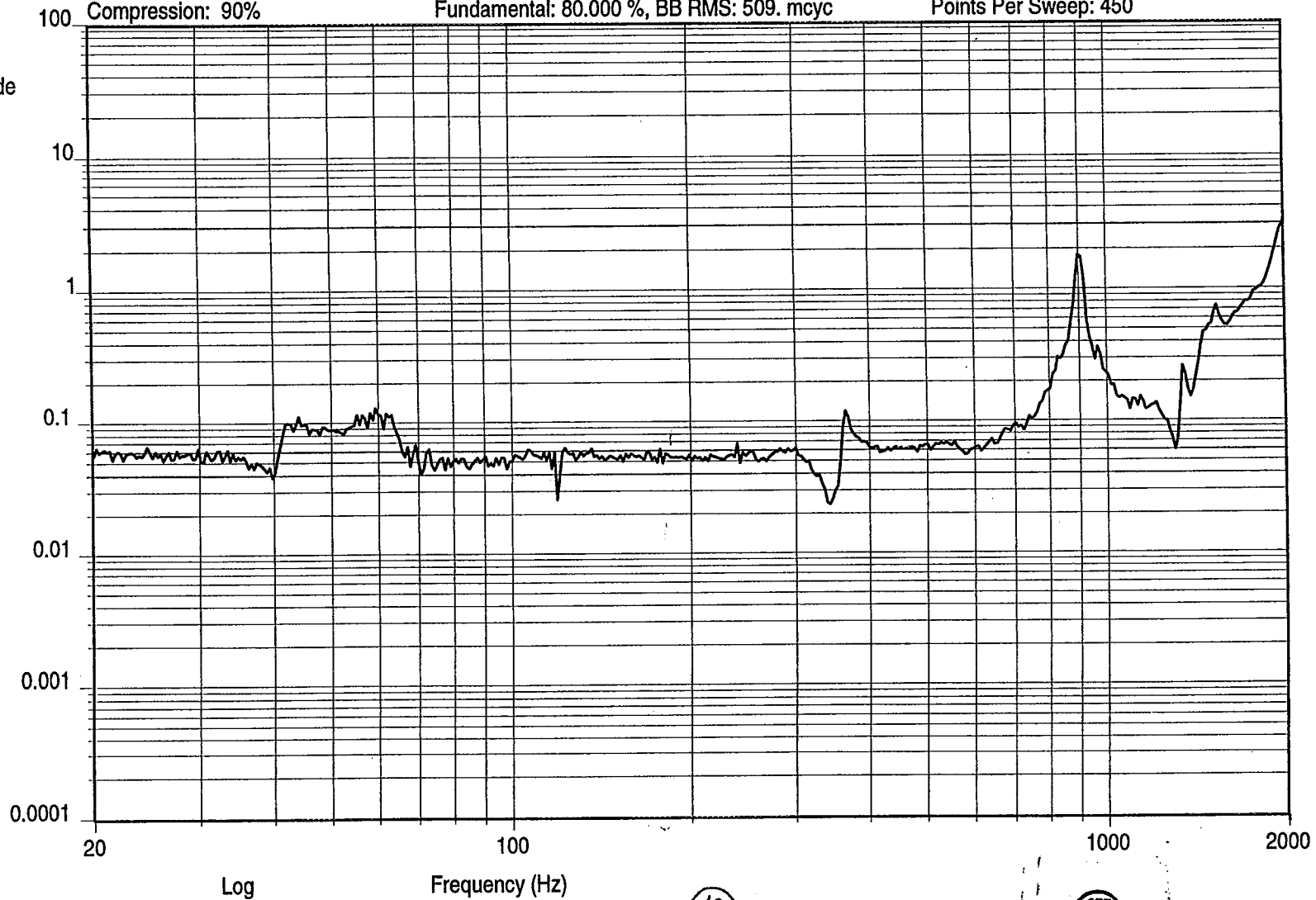
Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log

Ratio



09:38:45
Tue Apr 07 1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Data Review Name: AMSU_A2.tmp



APR 07 1998

2/CONTROL



APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

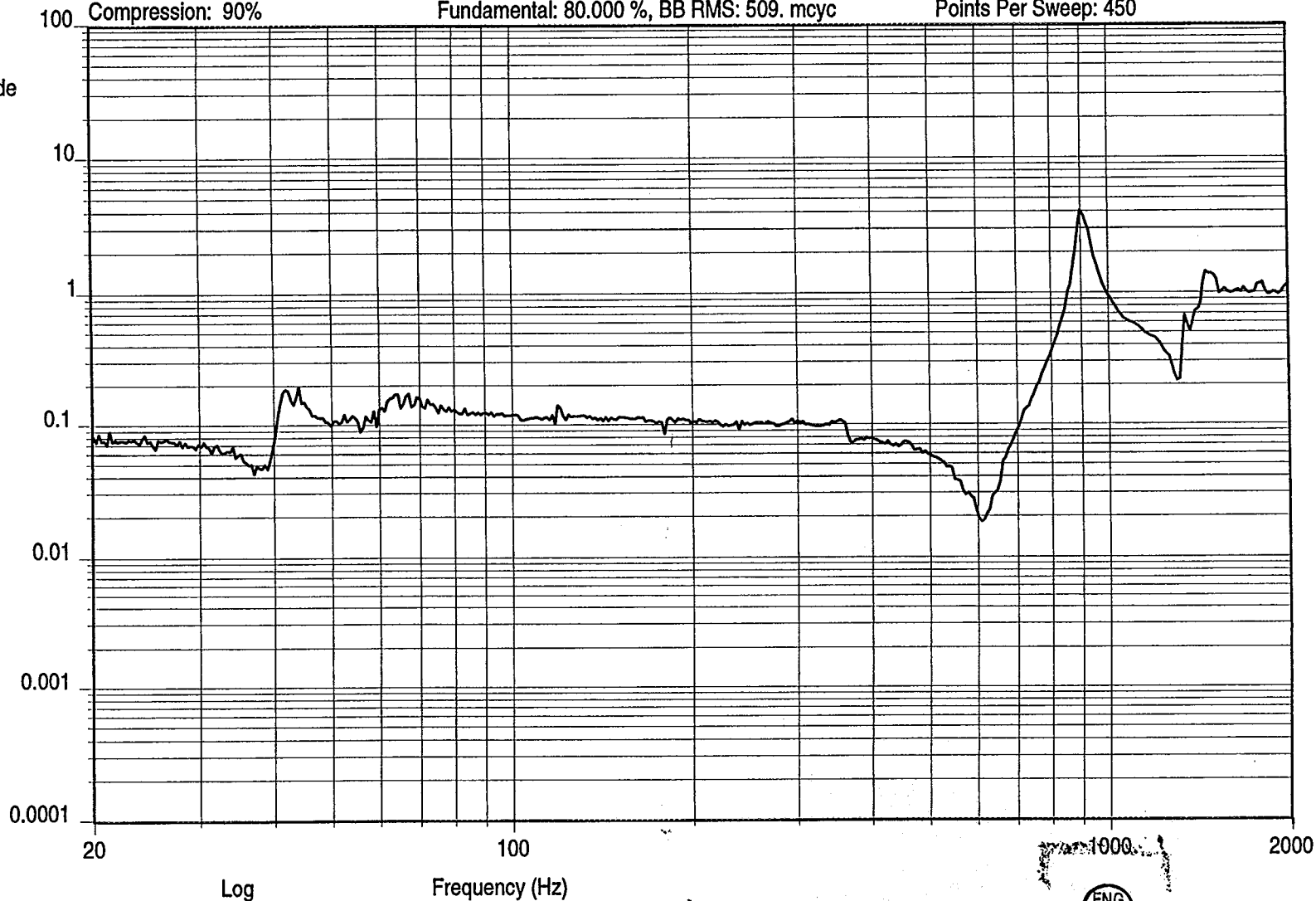
Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log

Ratio



09:38:45
Tue Apr 07 1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE X SINE SWEEP S/N F03 METSAT
Sine Data Review Name: AMSU_A2.tmp



APR 07 1998

3/CONTROL



APR 07 1998

Sine Version 4.6.0 Test File Listing

File Name: /usr/home/vcs/sine/test/AMSU_A2
 Current Date: Tue Apr 07 1998 09:25:09

CONTROL PARAMETERS:

DURATION -
 Type: Sweeps
 Sweeps: 1.00
 Test Time (hhh:mm:ss): 000:03:19
 CONTROL STRATEGY -
 Control Spectrum: Average
 Filter Type: Proportional
 Filter Specification: Fundamental 80.00 %, RMS 509. mcyc
 EQUALIZATION -
 Test Level: 0.00 dB
 OPERATION MODE -
 Manual Operation: Enable
 STARTUP/SHUTDOWN -
 Startup Rate: 10.00 dB/sec
 Shutdown Rate: 20.00 dB/sec
 Level Increment: 0.10 dB
 COMPRESSION PARAMETERS -
 Manual Override: Enable
 Record Manual Changes: Disable
 SWEEP PARAMETERS -
 Manual Sweep Start: No
 Sweep Mode: Log
 Sweep Rate Definition: 100%50%25%
 Sweep Rate 1: 2.0000 Oct/min
 Sweep Rate 2: 1.0000 Oct/min
 Sweep Rate 3: 0.5000 Oct/min
 Sweep Duration (hhh:mm:ss): 000:03:19
 Manual Override: Enable
 Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
 Maximum Frequency: 2000.000 Hz
 Transducer Crossover: 20.000 Hz
 Crossover Range: 10.000 %
 Frequency Points: 450.000
 Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
 Minimum Acceleration (0-pk): 0.250 g
 Maximum Acceleration (0-pk): 0.250 g
 Maximum Velocity (0-pk): 0.768 in/s
 Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
 Minimum Frequency: 20.00 Hz
 Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label 1	Documentation Label 2
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	X AXIS	
3	Auxiliary	No	10.00	Z AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

H(f) Pair	Response Channel	Measurement Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	2/CONTROL
3	4	1	3/ CONTROL
4	5	1	4/ CONTROL

DOCUMENTATION:

Display Text -
 Title 1: AMSU PLO S/O 431615,P/N 1348360-1
 Title 2: PRE X SINE SWEEP S/N F03
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Off
 Message Log -
 Log Mode: Off
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

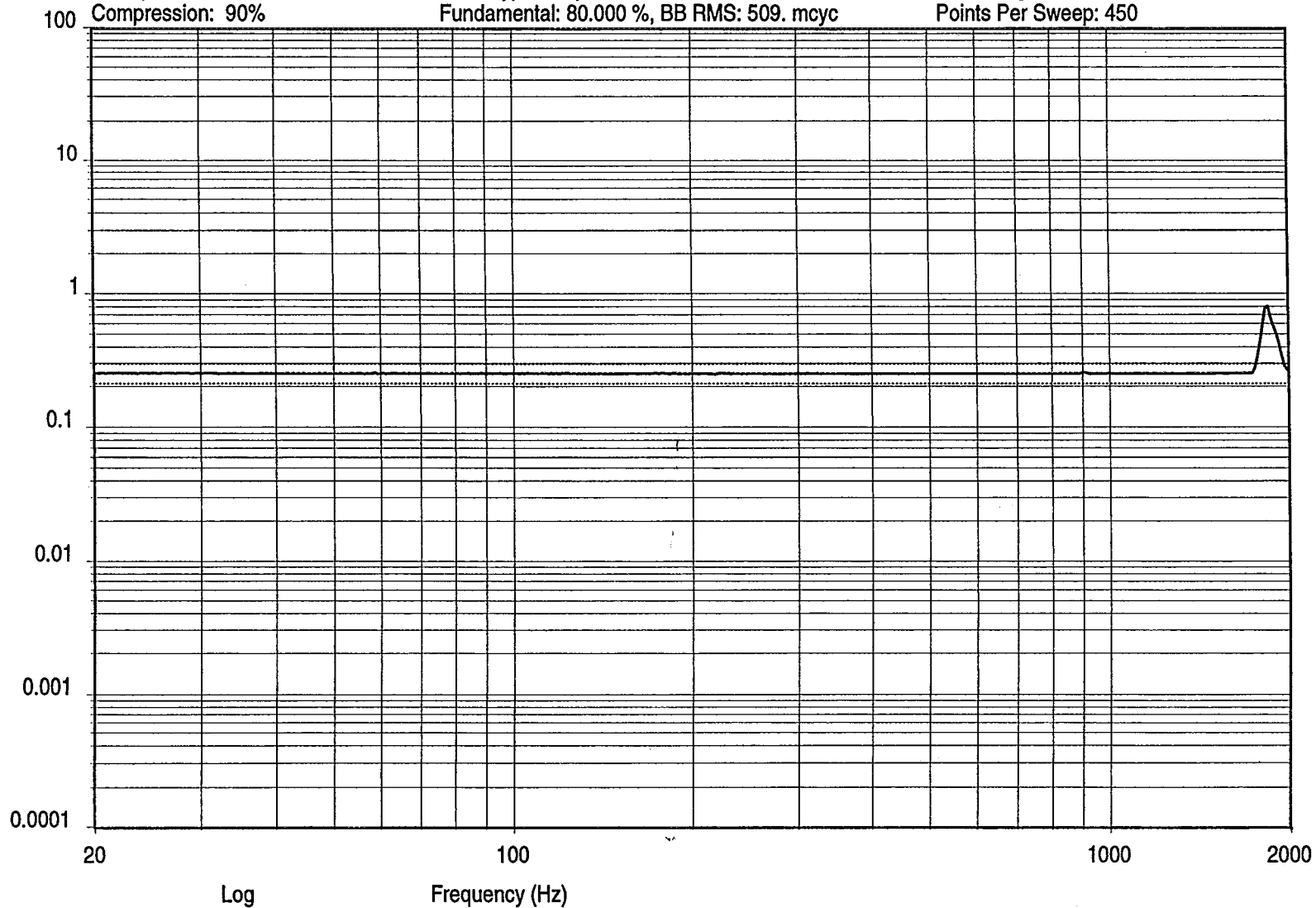
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



10:19:47
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



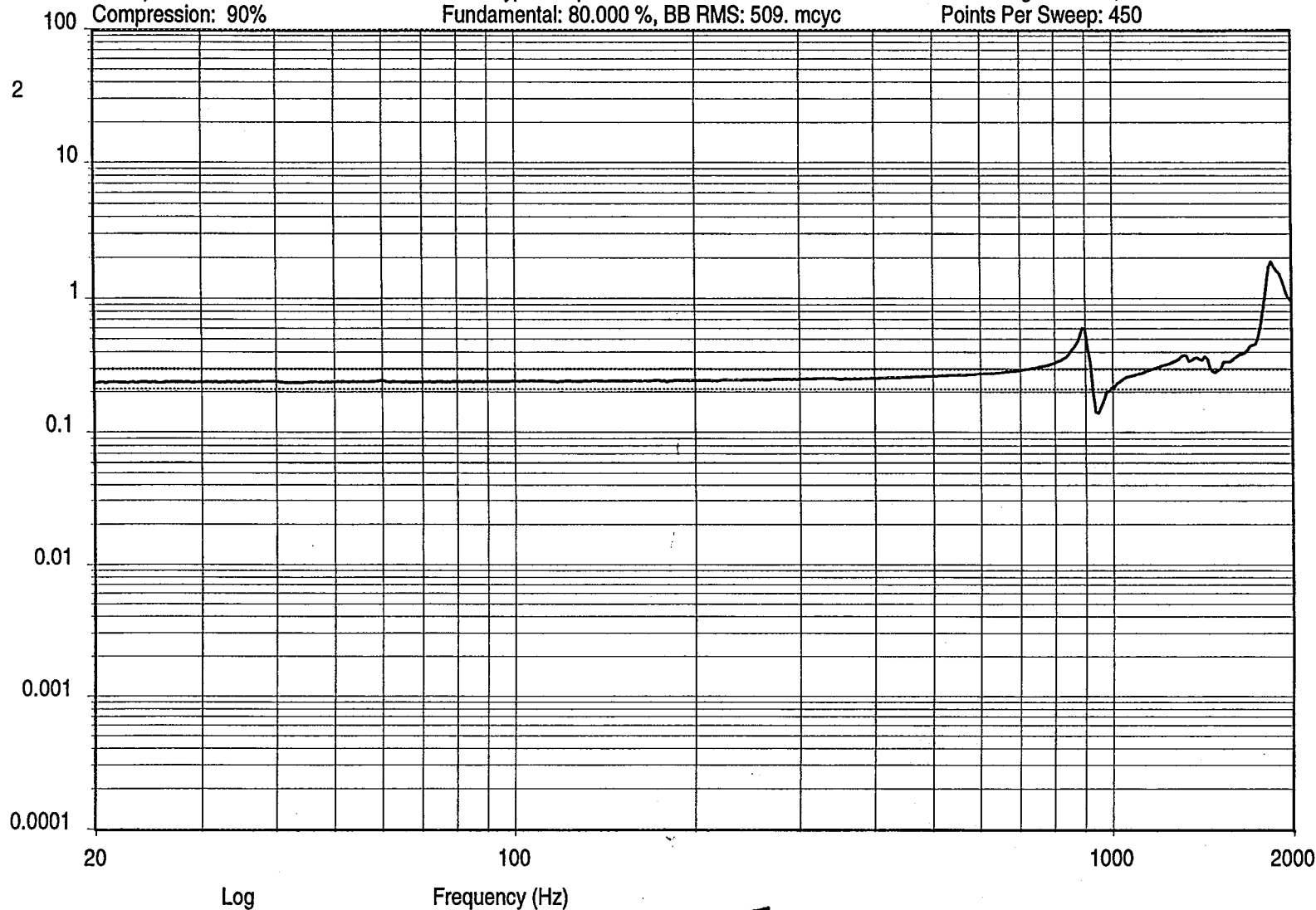
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



10:19:57
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998
ENG 229

X AXIS

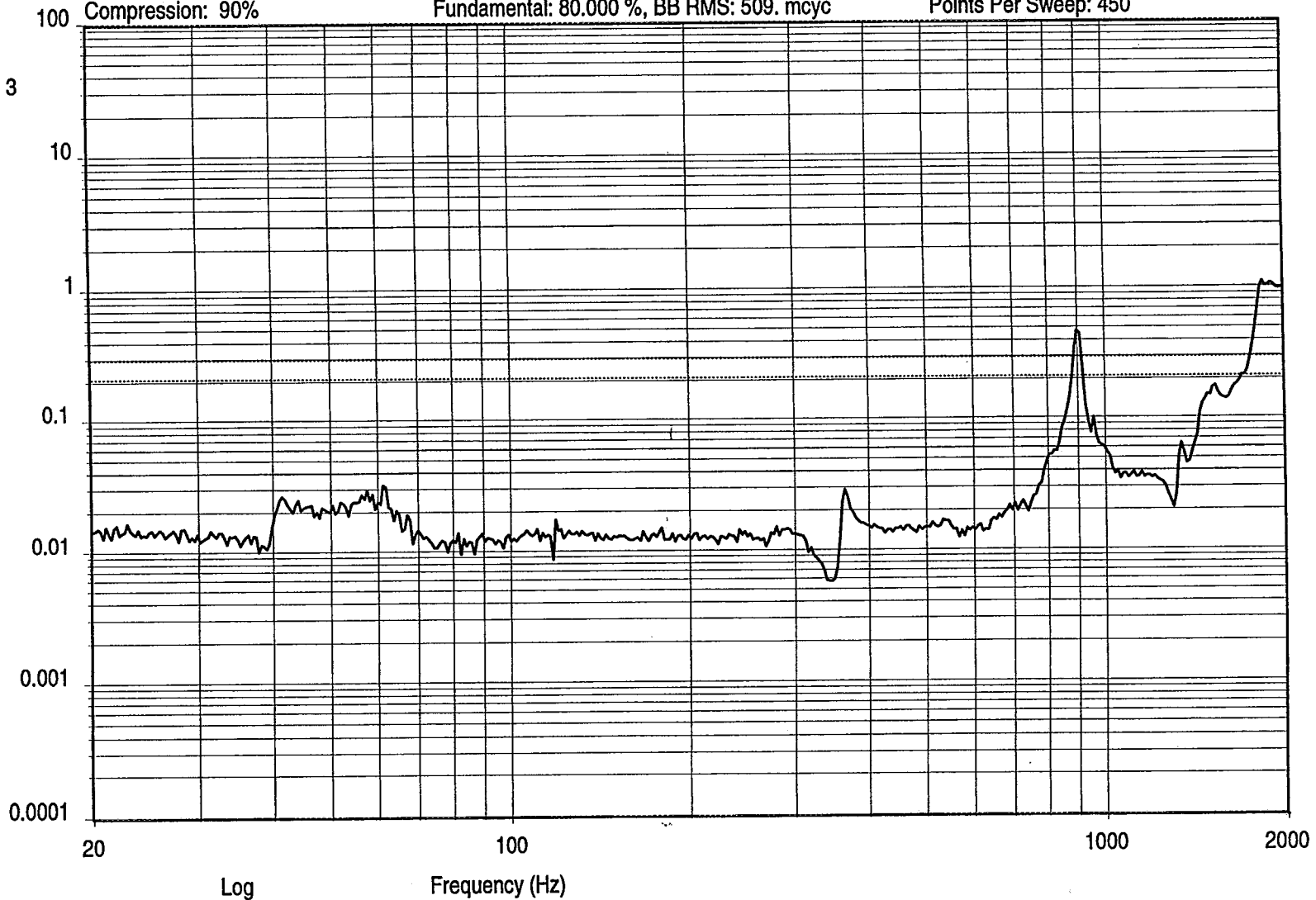
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



Z AXIS

10:19:52
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

161
ENG
229
APR 07 1998

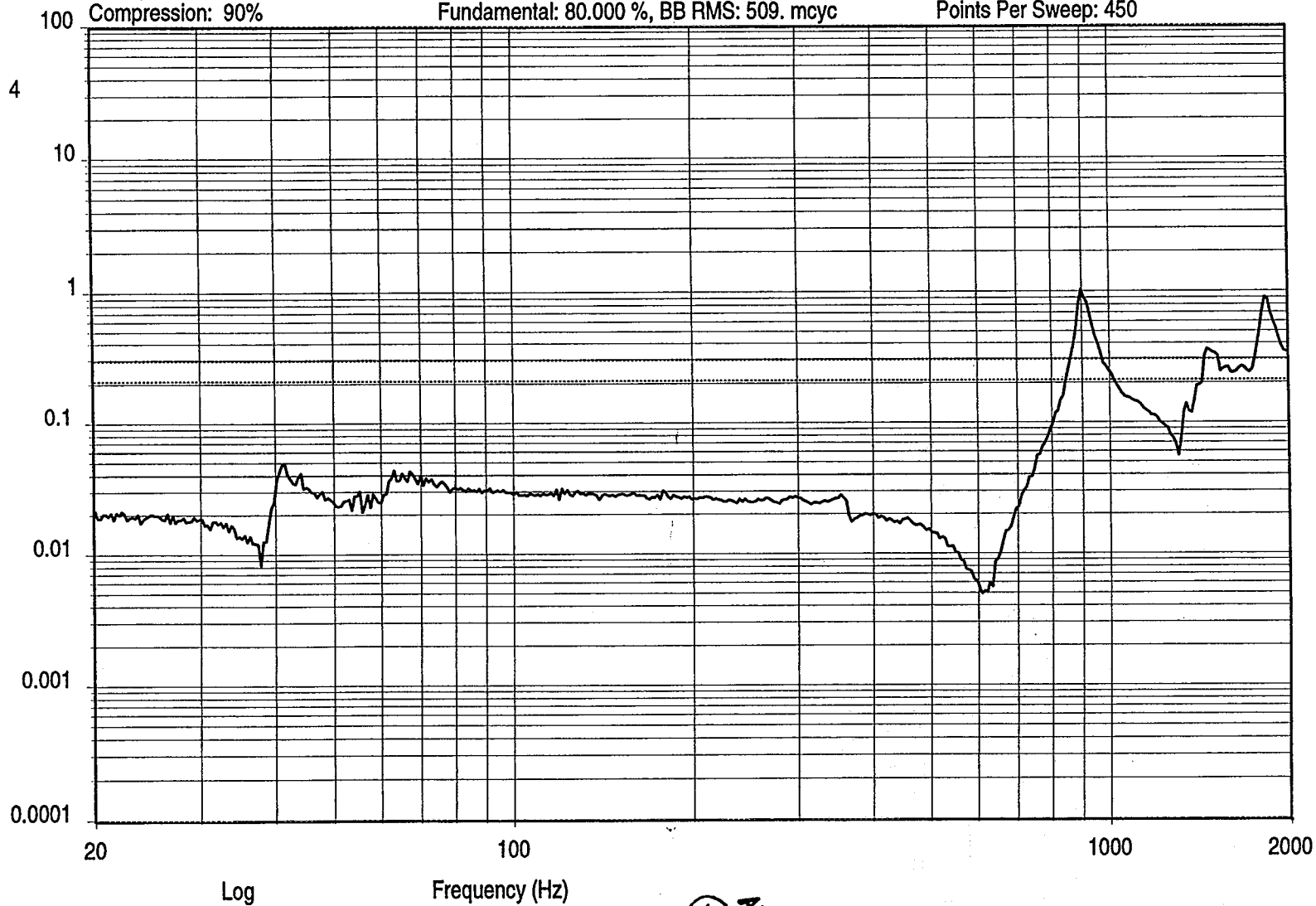
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



10:20:01
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998
229

Y AXIS

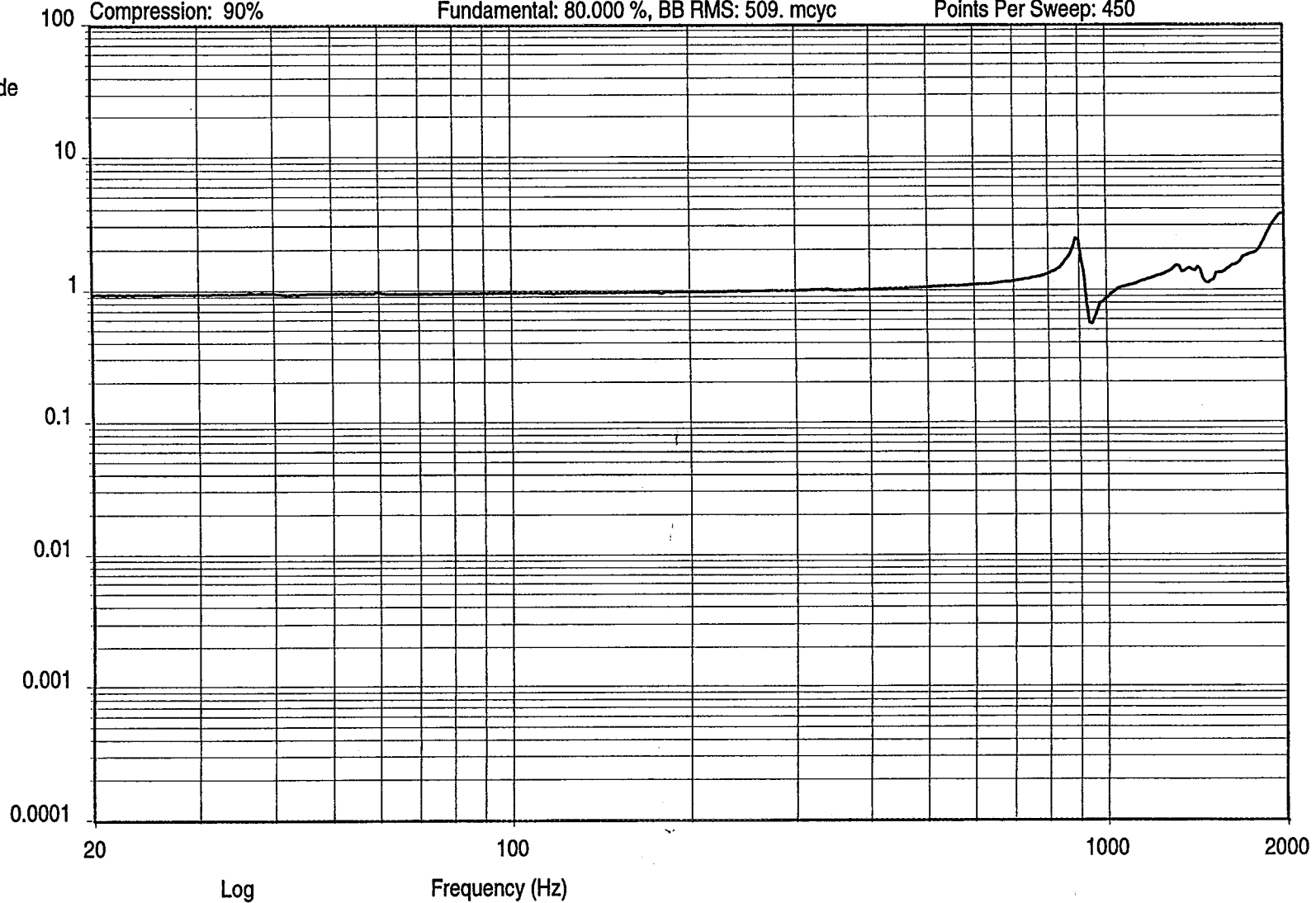
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

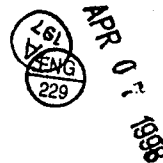
H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



10:20:20
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



2/CONTROL

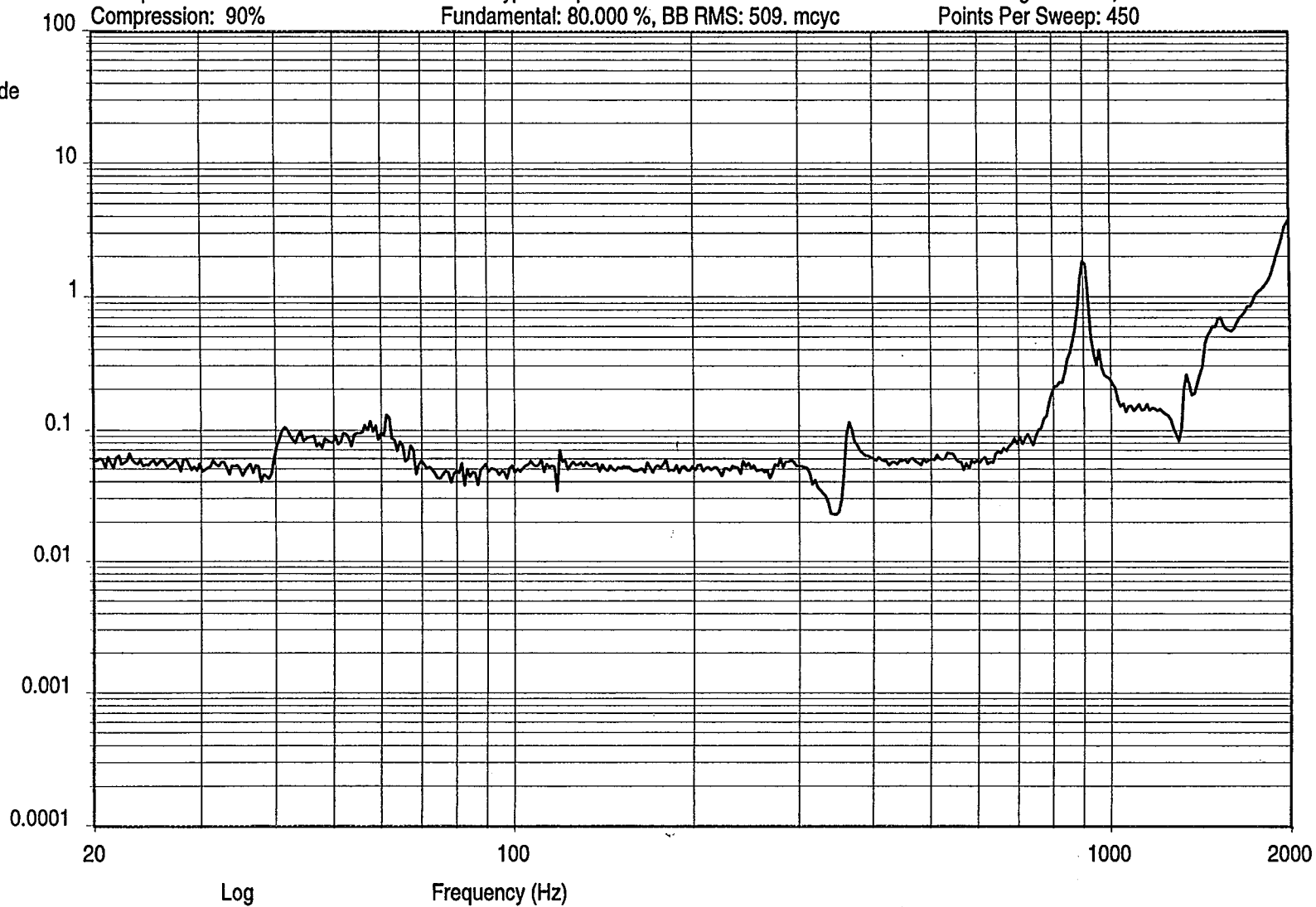
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log
Ratio



10:20:24
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL

APR 07 1998
229

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

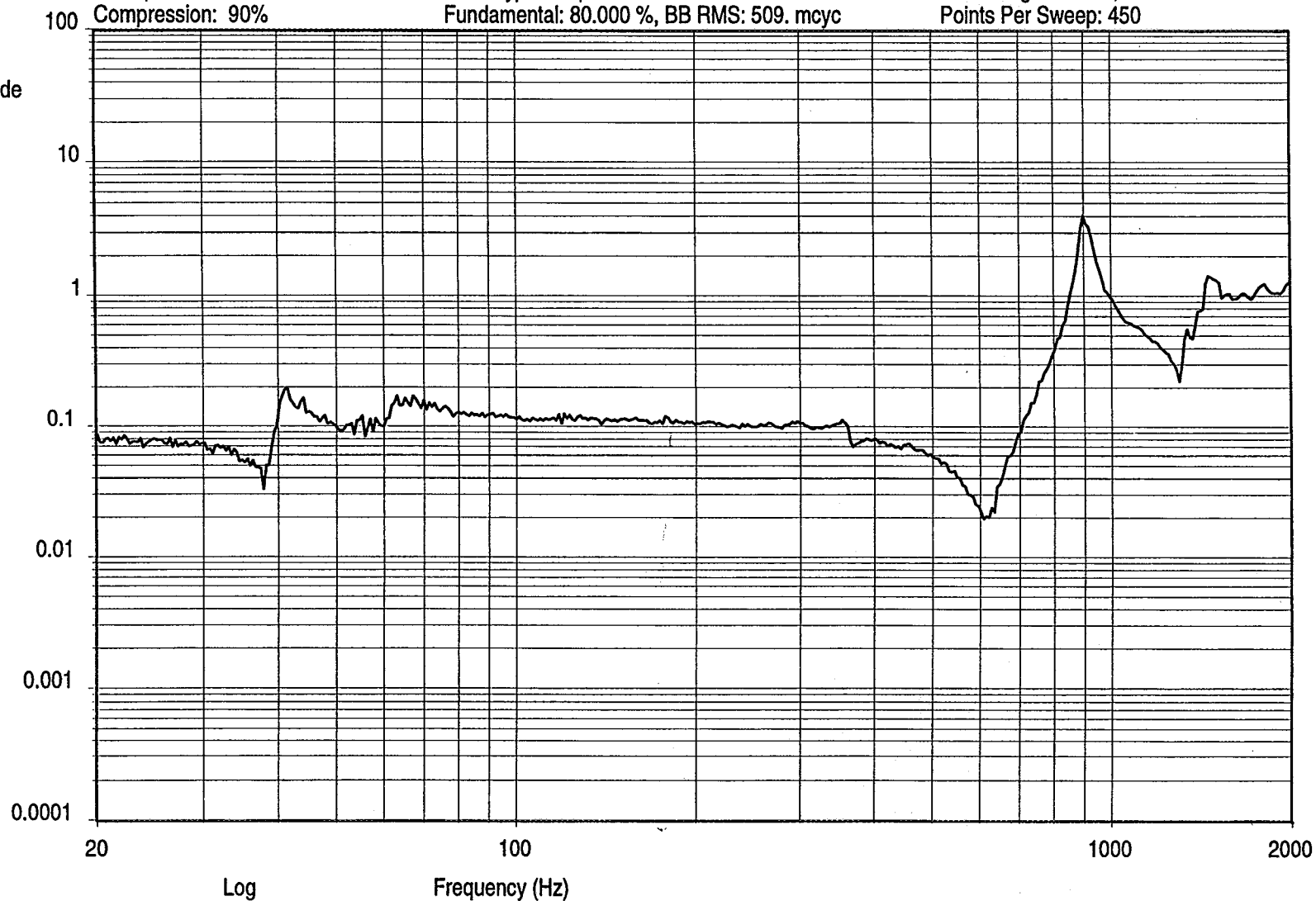
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

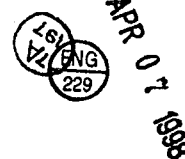
Log

Ratio



10:20:28
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST X SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 10:13:22

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled	DC Acceler	g	0.00		Fundamental
2	Auxiliary	No	10.00	Nullled	DC Acceler	g			Fundamental
3	Auxiliary	No	10.00	Nullled	DC Acceler	g			Fundamental
4	Auxiliary	No	10.00	Nullled	DC Acceler	g			Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation Label
1	Control	Yes	100.00	CONTROL	Label 2
2	Auxiliary	No	10.00	X AXIS	
3	Auxiliary	No	10.00	Z AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -
 Title 1: AMSU PLO S/O 431615,P/N 1348360-1
 Title 2: POST X SINE SWEEP S/N F03 METSAT
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Off
 Message Log -
 Log Mode: Off
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

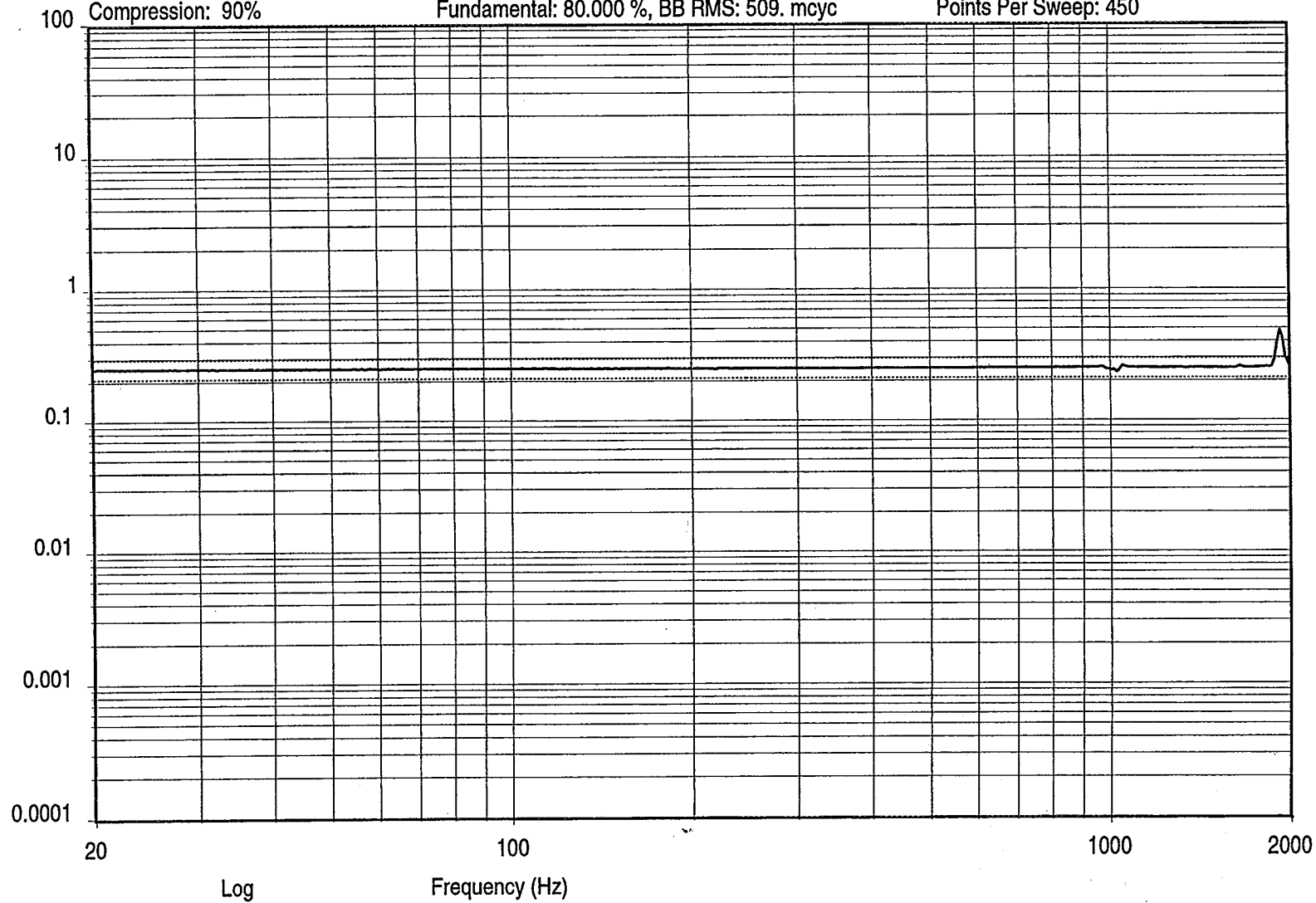
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

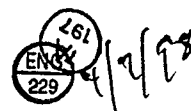
Control

Log
Acceleration
g (0-pk)



13:06:10
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

Log
Acceleration
g (0-pk)

10

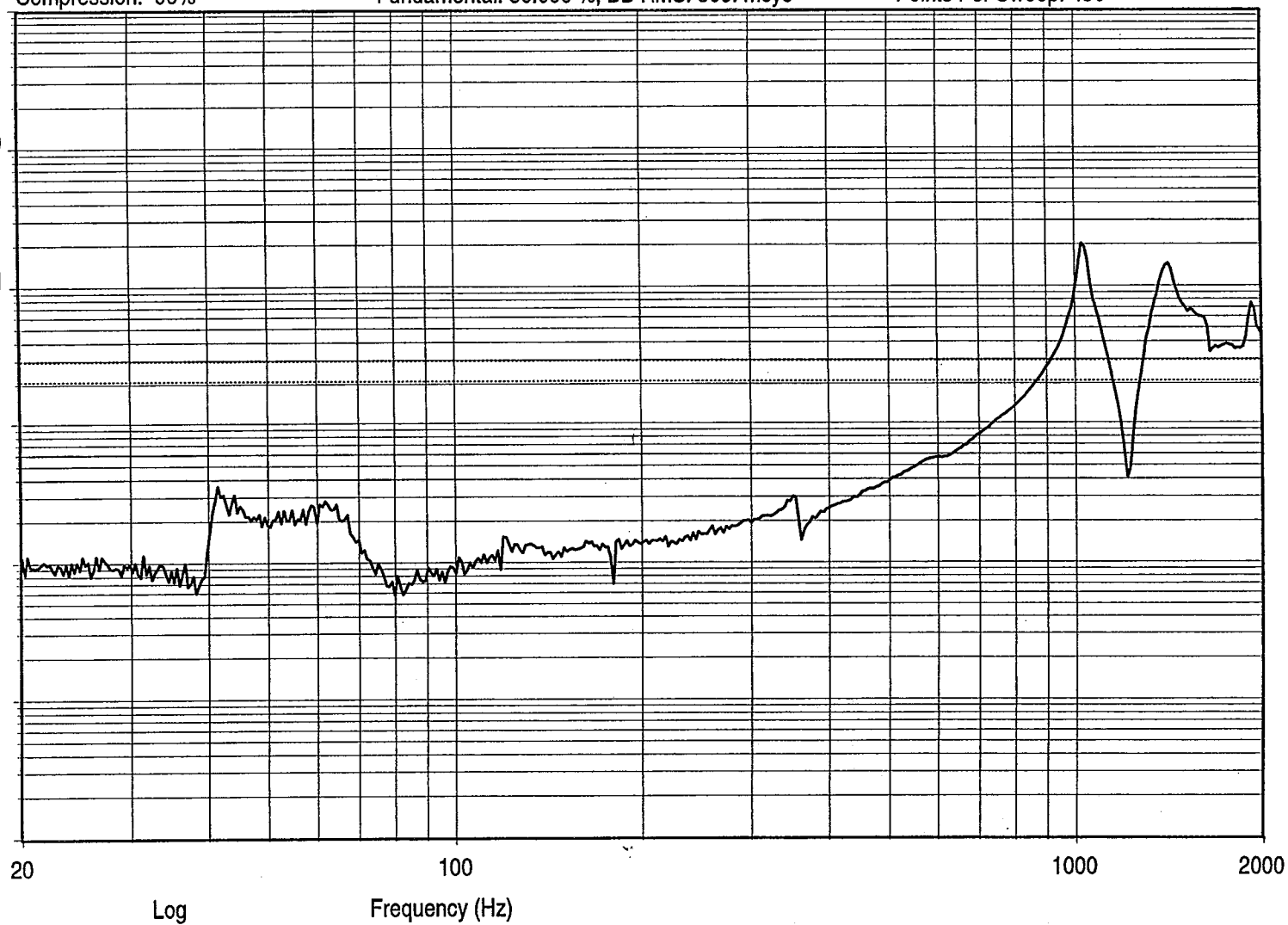
1

0.1

0.01

0.001

0.0001



13:06:19
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

X AXIS



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

3

Log
Acceleration
g (0-pk)

10
1
0.1
0.01
0.001
0.0001

20

100

1000

2000

Log

Frequency (Hz)

Z AXIS

13:06:13
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



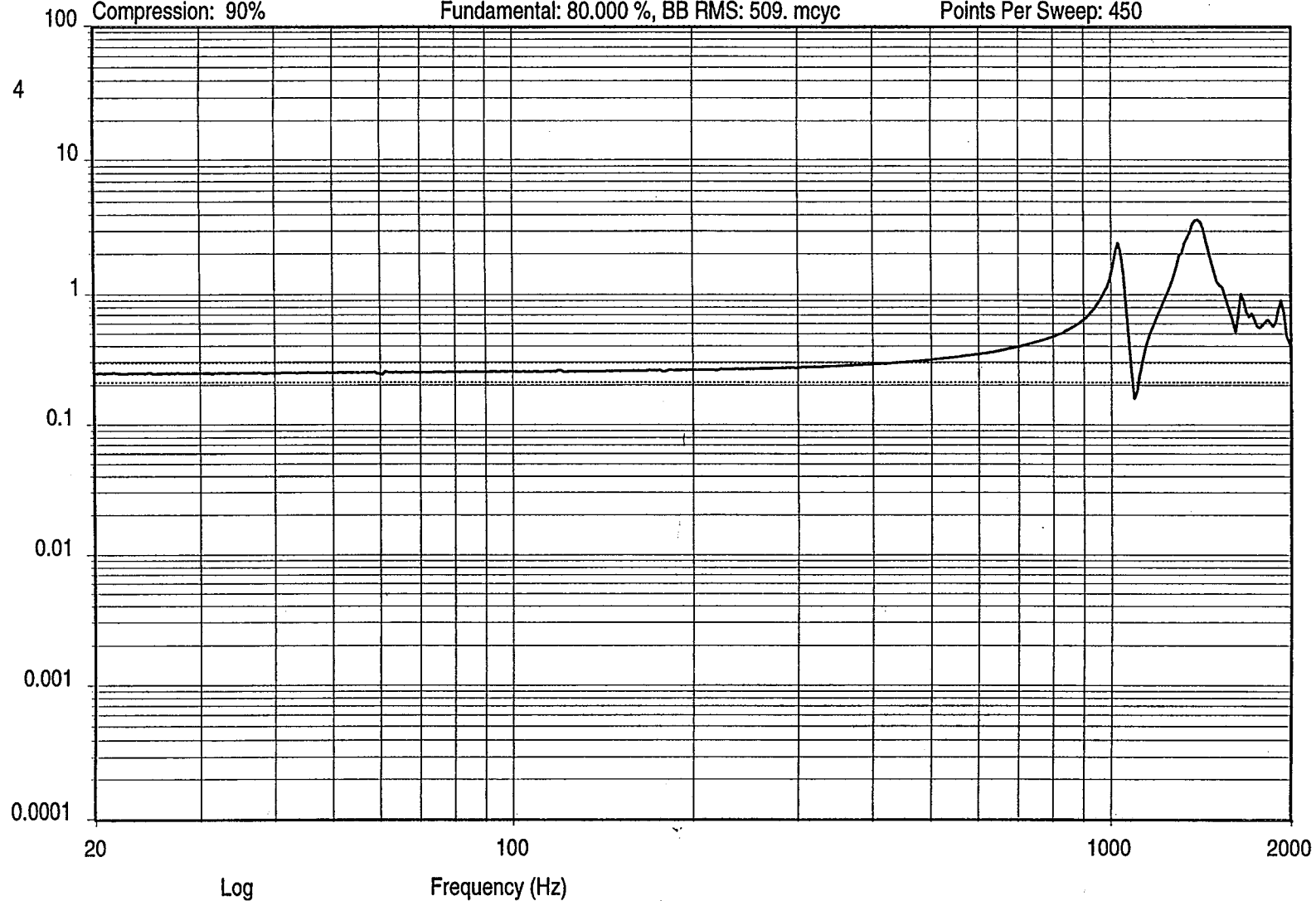
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



13:06:23
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

Y AXIS



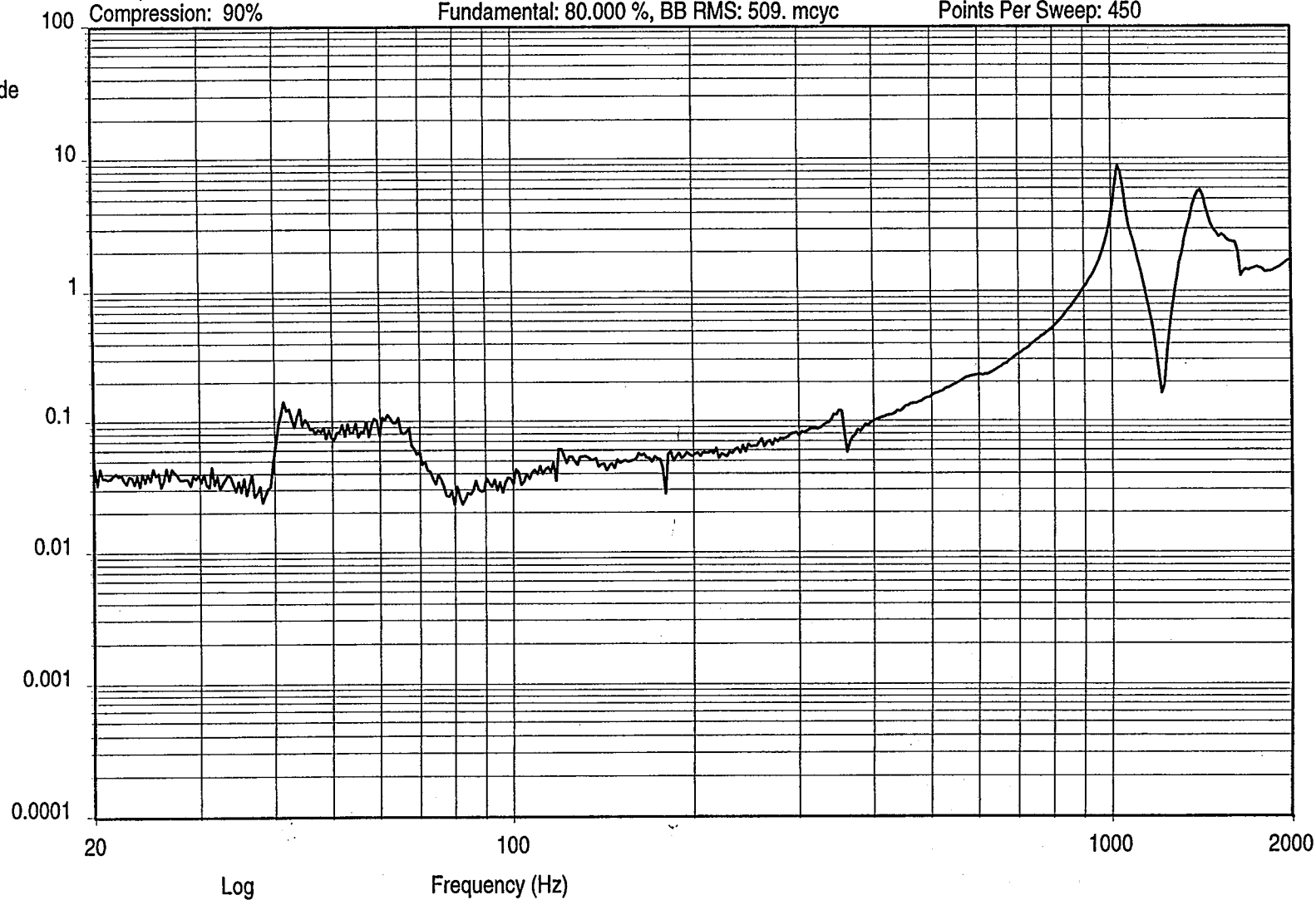
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



13:06:41
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



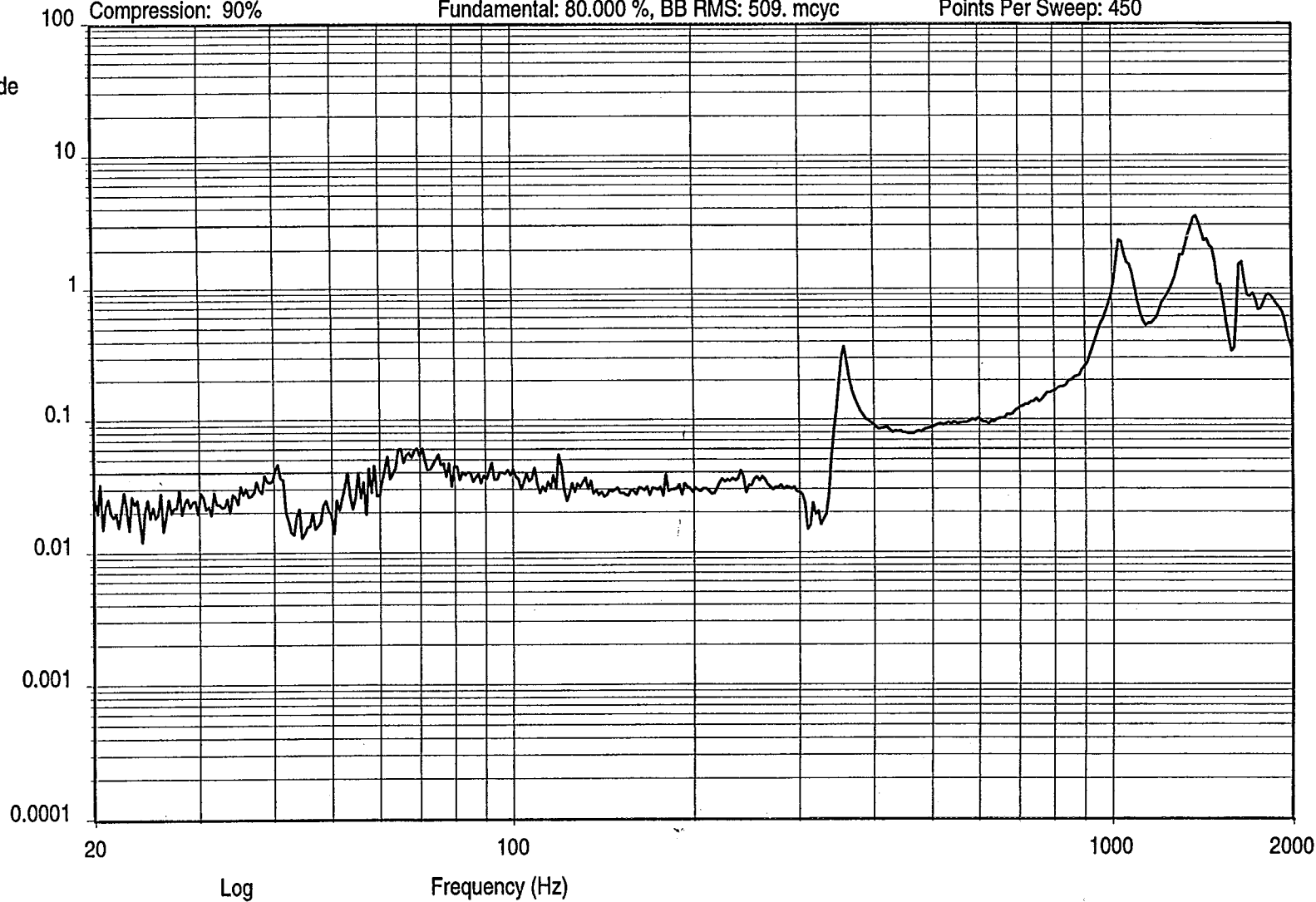
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 /Ch 1

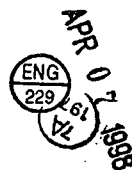
Log
Ratio



13:06:47
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

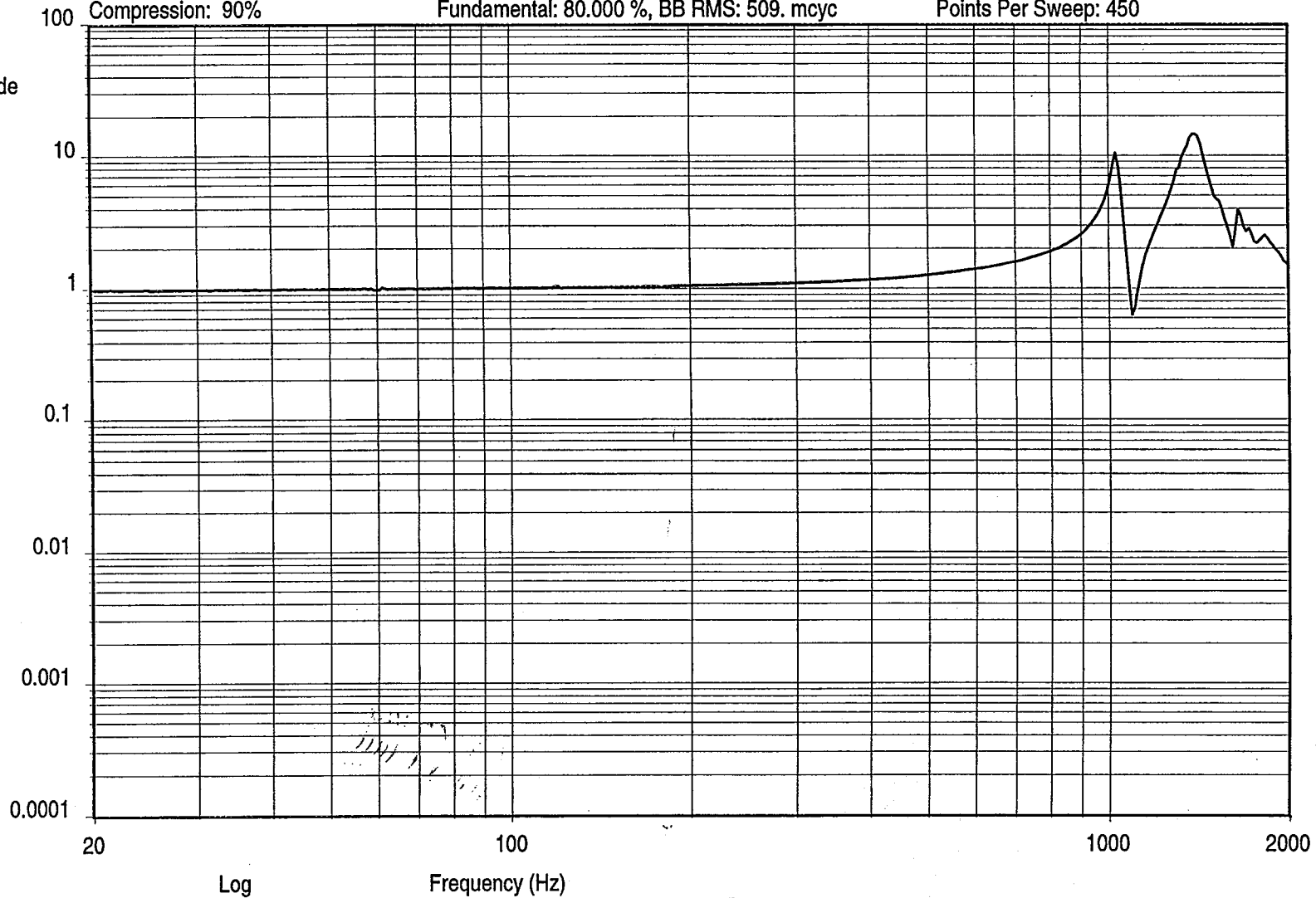
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log

Ratio



13:06:52
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 12:58:32

CONTROL PARAMETERS:

DURATION -
Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19
CONTROL STRATEGY -
Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc
EQUALIZATION -
Test Level: 0.00 dB
OPERATION MODE -
Manual Operation: Enable
STARTUP/SHUTDOWN -
Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB
COMPRESSION PARAMETERS -
Manual Override: Enable
Record Manual Changes: Disable
SWEEP PARAMETERS -
Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Control Units	Profile Weighting	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g	0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g			Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g			Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g			Fundamental

(Continued for Labels...)

Channel Channel Loop Sensitivity Channel Documentation

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label 1	Label 2
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	X AXIS	
3	Auxiliary	No	10.00	Z AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Response Reference Label

Pair	Channel	Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/CONTROL

DOCUMENTATION:

Display Text -

Title 1: AMSU PLO S/O 431615,P/N 1348360-1
 Title 2: PRE Y SINE SWEEP S/N F03 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Storage Mode: Off

Message Log -

Log Mode: Off

Printing -

Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

10:04:38
06-Apr-1998

Test Name: PLO.tmp

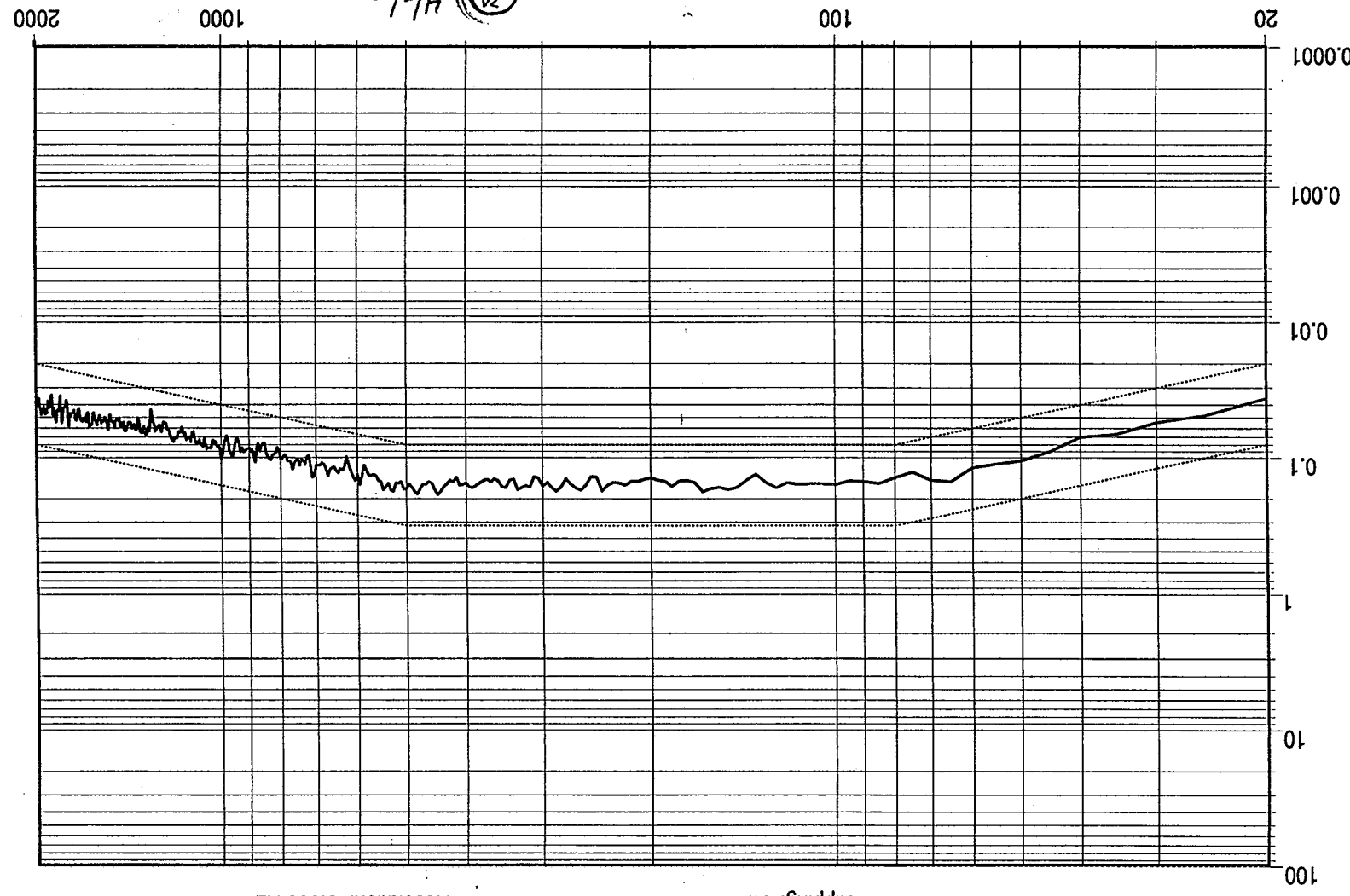
AMSU PHASE LOCK OSCILLATOR S/O, P/N 5/N F03
VERTICAL AXIS CHECKOUT 4/31615

ENG 217

4/7/98

7A 190

4/7/98



Test Level: 0.000 dB
Test Time: 000:01:00
Reference RMS: 13.576
Clipping: Off
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Log
g₂/Hz
DOF 200
RMS:
13.560 g

Control

Random Version 3.6.0 Test File Listing

File Name:

PLO

Current Date:

Tue Apr 07 1998 09:00:57

CONTROL PARAMETERS:

DURATION -

Test Time (hhh:mm:ss): 000:01:00

CONTROL STRATEGY -

Degrees of Freedom: 200

Control Spectrum: Average

Output Window: Kaiser-Bessel

OPERATION MODE -

Manual Operation: Enable

EQUALIZATION -

Start Level: -18.0 dB

Initial Test Level: -18.0 dB

Time at Initial Level: Off

Prestored Drive: Off

STARTUP/SHUTDOWN -

Startup Rate: 20.0 dB/sec

Time to Full Level: 60.0 sec

Level Increment: 2.0 dB

Reset Measurement Average: Yes

Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz

Maximum Frequency: 2000.00 Hz

Frequency Lines: 400.00 Lines

Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS

Maximum Acceleration (0-pk): 40.73 g

Maximum Velocity (0-pk): 12.86 in/s

Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g

RMS Abort: 31.0 g

RMS Abort DOF: 8

Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines

Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz

Maximum Frequency: 2000.0 Hz

Level: -12.0 dB

Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS

Maximum Drive: 300.0 mV RMS

Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping:

Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS A (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT X AXIS	
3	Auxiliary	No	10.00	UNIT Z AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: No

H(f) Response Reference Label

Pair	Channel	Reference Channel	Label
1	3	2	3/CONTROL
2	4	2	4/CONTROL
3	5	2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615

Title 2: X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

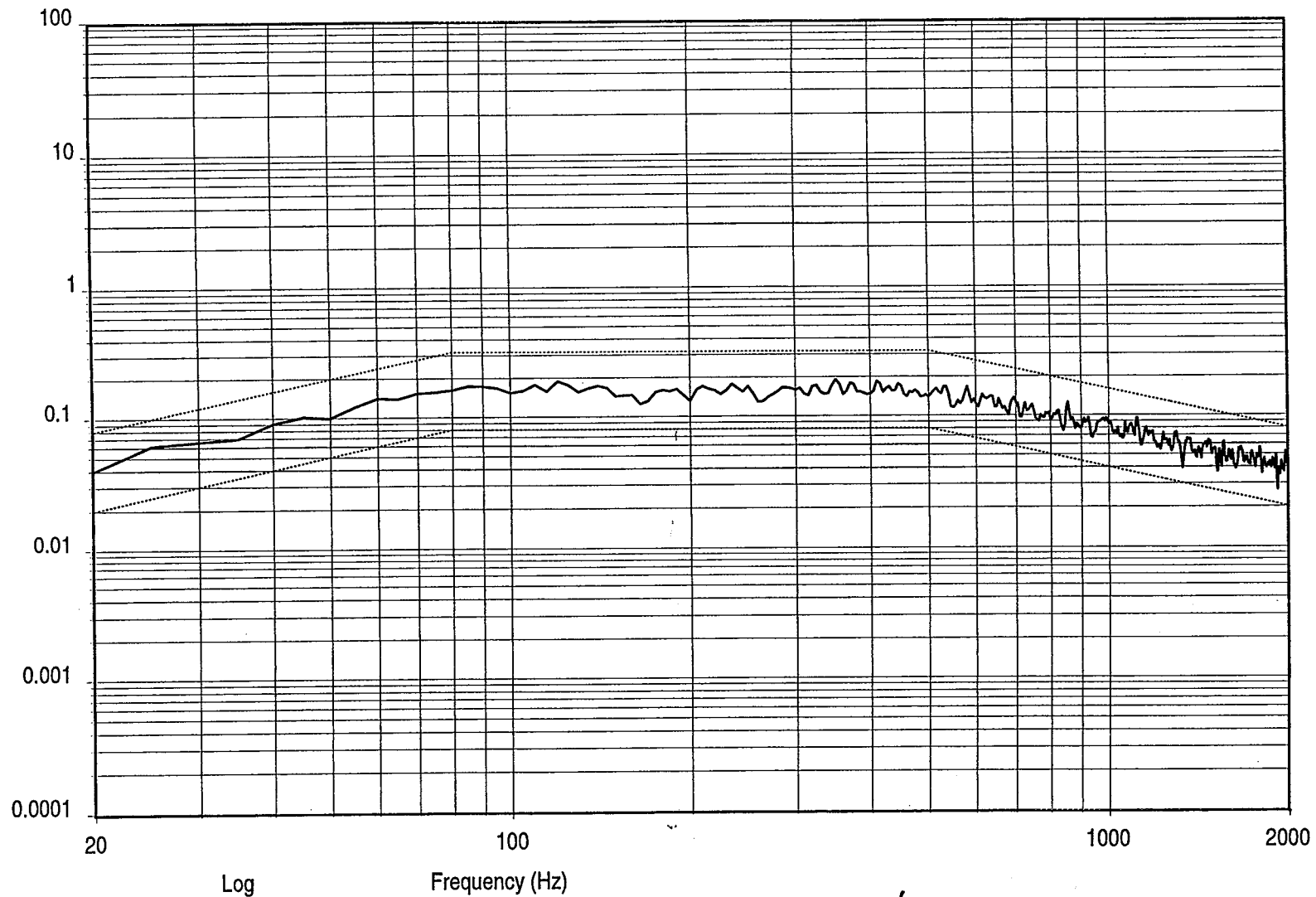
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

Log
 g^2/Hz

DOF 200

RMS:
13.533 g



11:27:33
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Z AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

ENG
229

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7A
268

4-7-97

Auxiliary
Chan. 2

Log
 g^2/Hz

DOF 120

RMS:

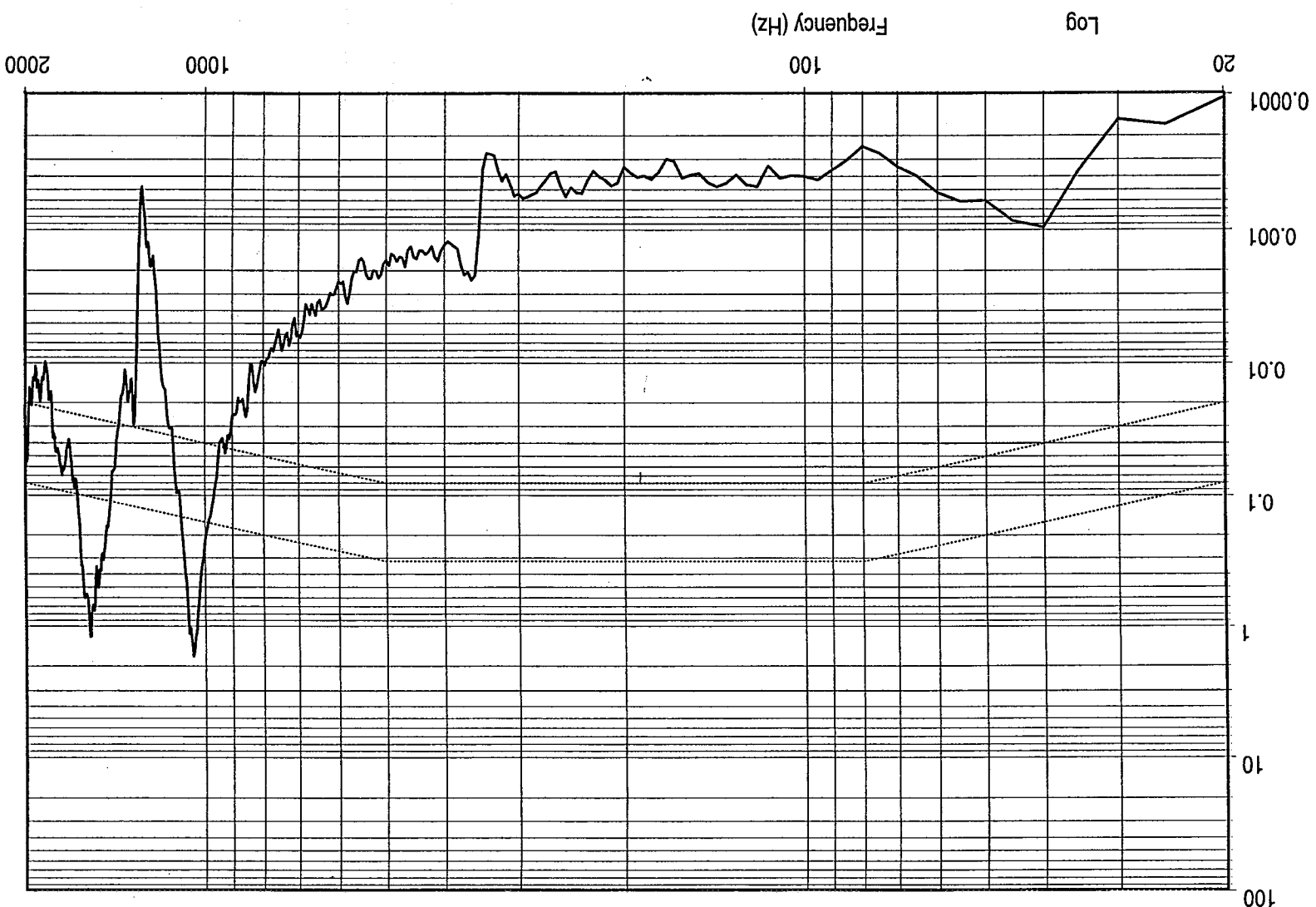
13.898 g

11:27:39
07-Apr-1998

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz



APR 07 1998
ENG 229
17.51

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Z AXIS TEST S/N F04,F03 P/N 1348360-1,1348360 METSAT
Test Name: PLO.tmp

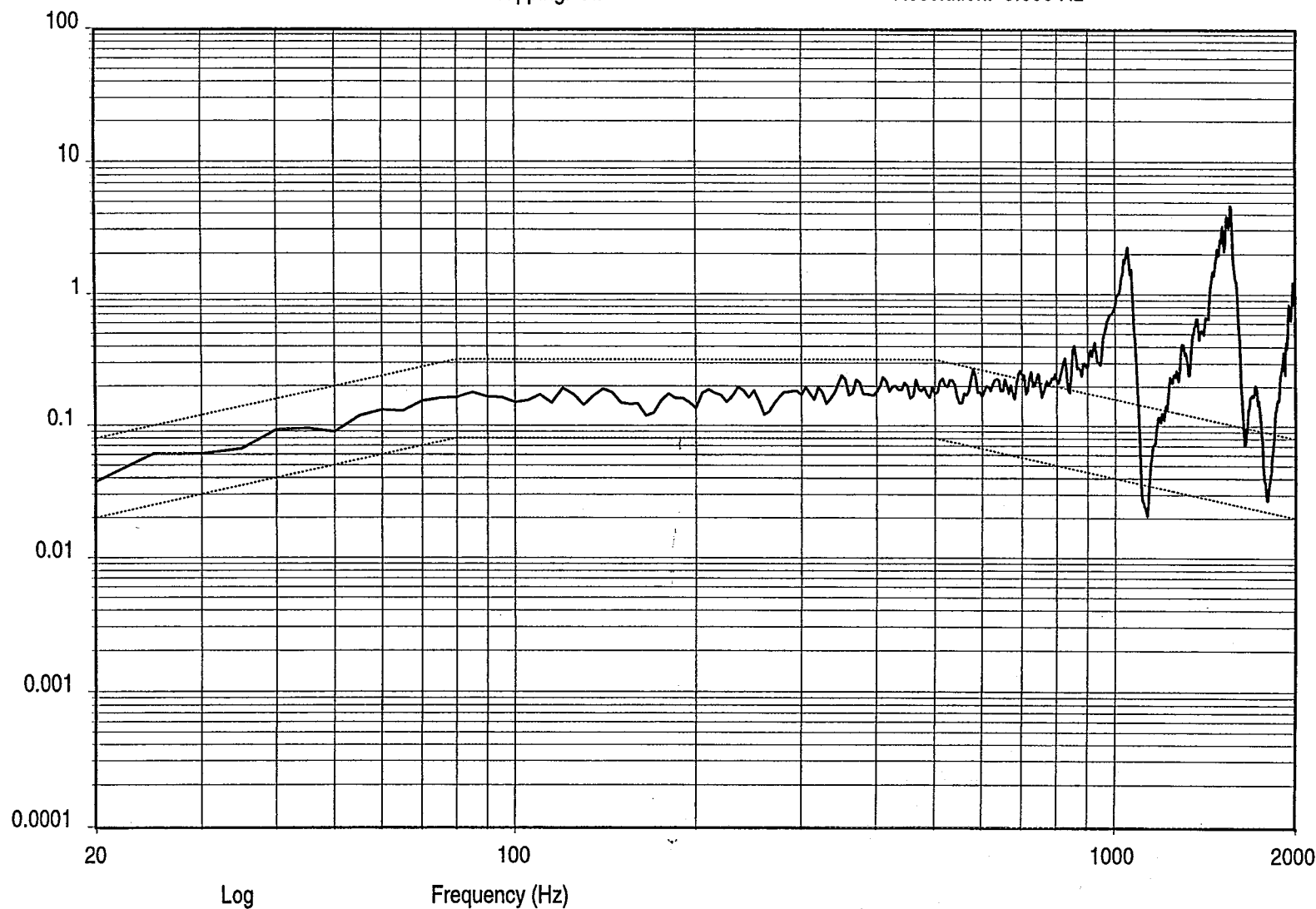
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 3

Log
 g^2/Hz
DOF 120
RMS:
30.320 g



11:27:36
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Z AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

ENG 229
L61
APR 07 1998
UNIT Z AXIS

Auxiliary
Chan. 4

Log
g²/Hz

DOF 120

RMS:

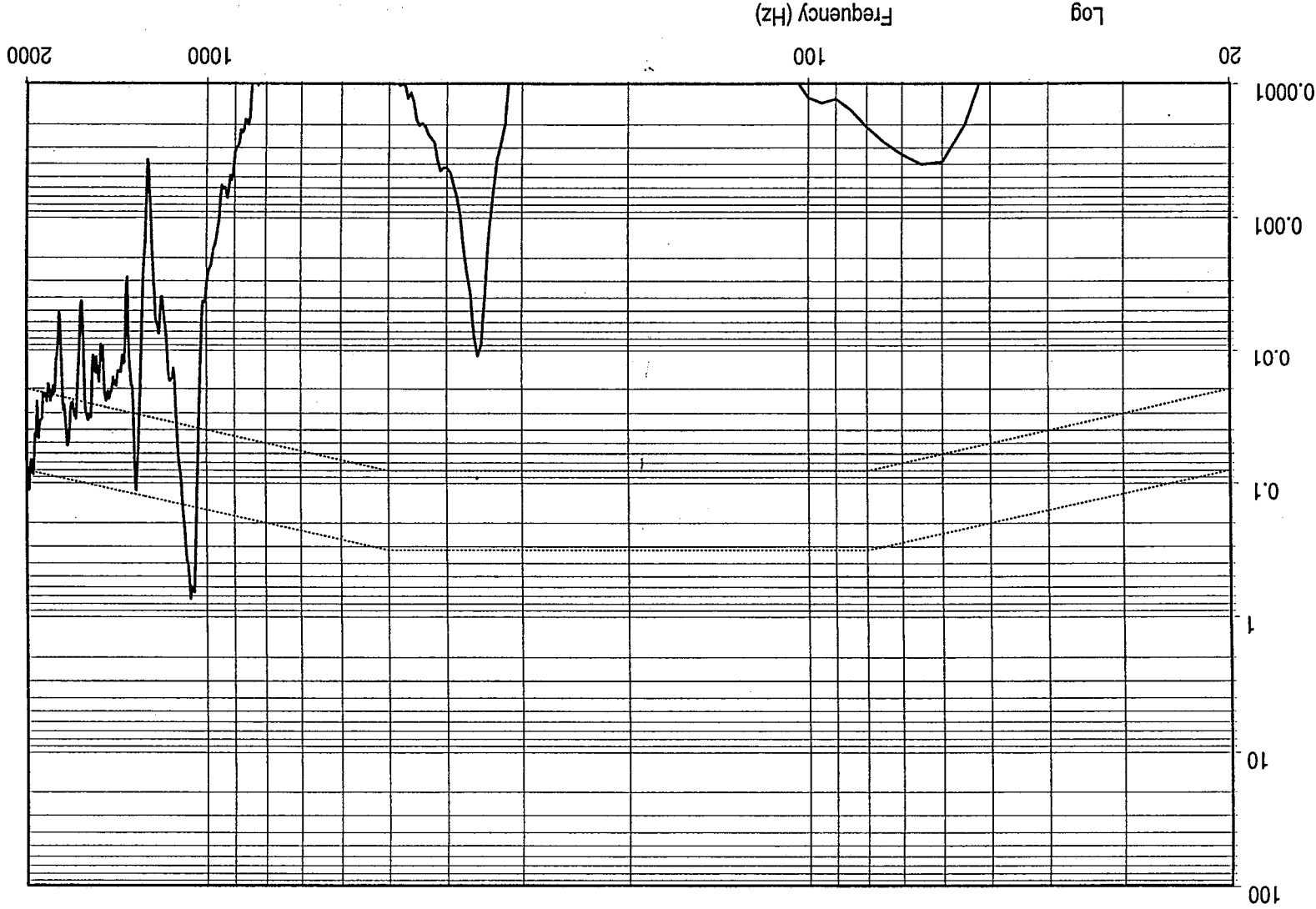
7.147 g

11:27:43
07-Apr-1998

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz



UNIT Y AXIS

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Z AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

APR 01 1998
ENG 229
151

Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 11:20:53

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -
Drive Clipping:

Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Abscissa (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Documentation Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT X AXIS	
3	Auxiliary	No	10.00	UNIT Z AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Pair	Channel	Reference Channel	Label
1	3	2	3/CONTROL
2	4	2	4/CONTROL
3	5	2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615

Title 2: Z AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

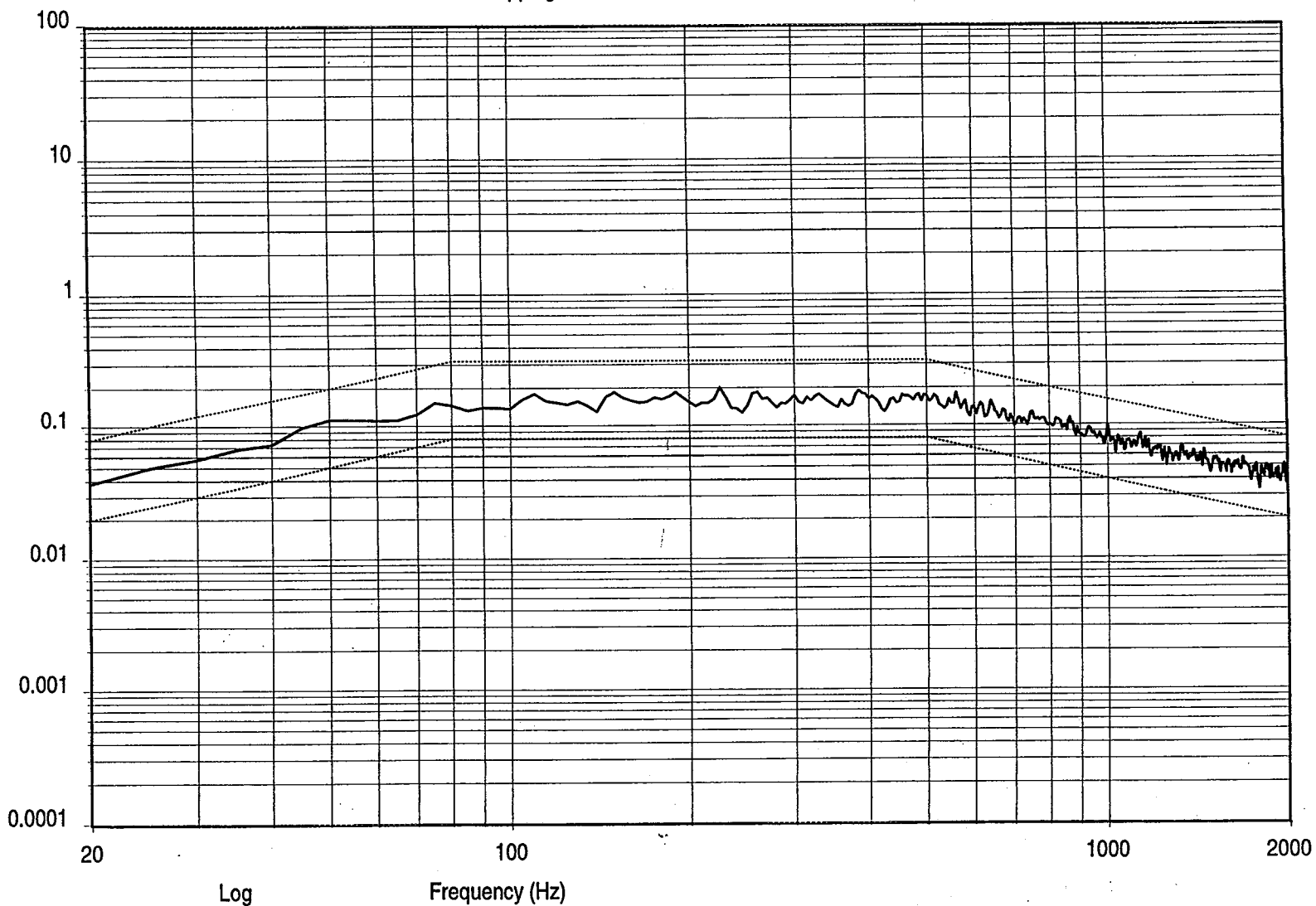
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

Log
 g^2/Hz

DOF 200

RMS:
13.590 g



10:09:12
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360

Test Name: PLO.tmp

ENG
229

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7A
268

2-7-98

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

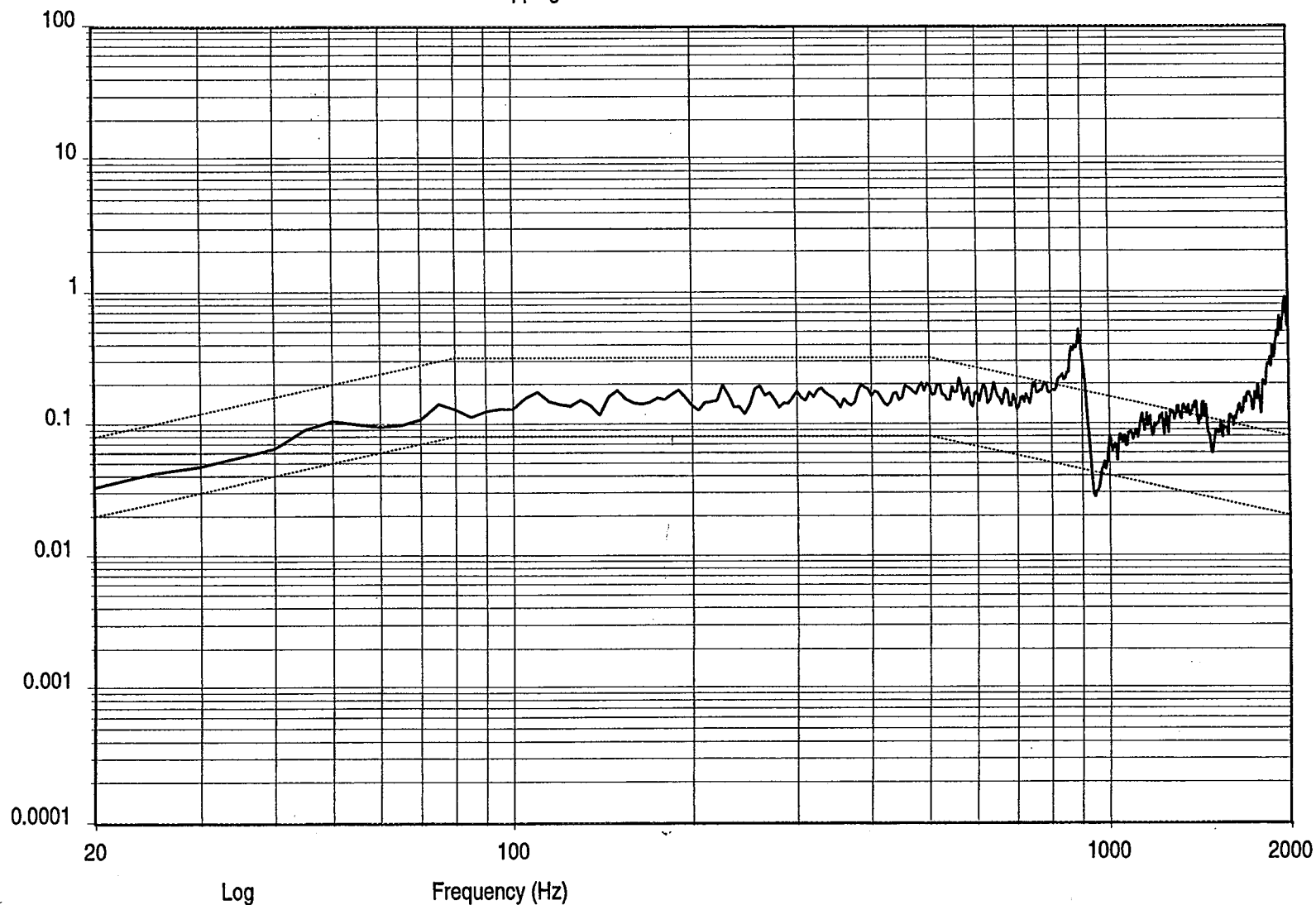
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 2

Log
 g^2/Hz

DOF 120

RMS:
18.456 g



10:09:14
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360
Test Name: PLO.tmp

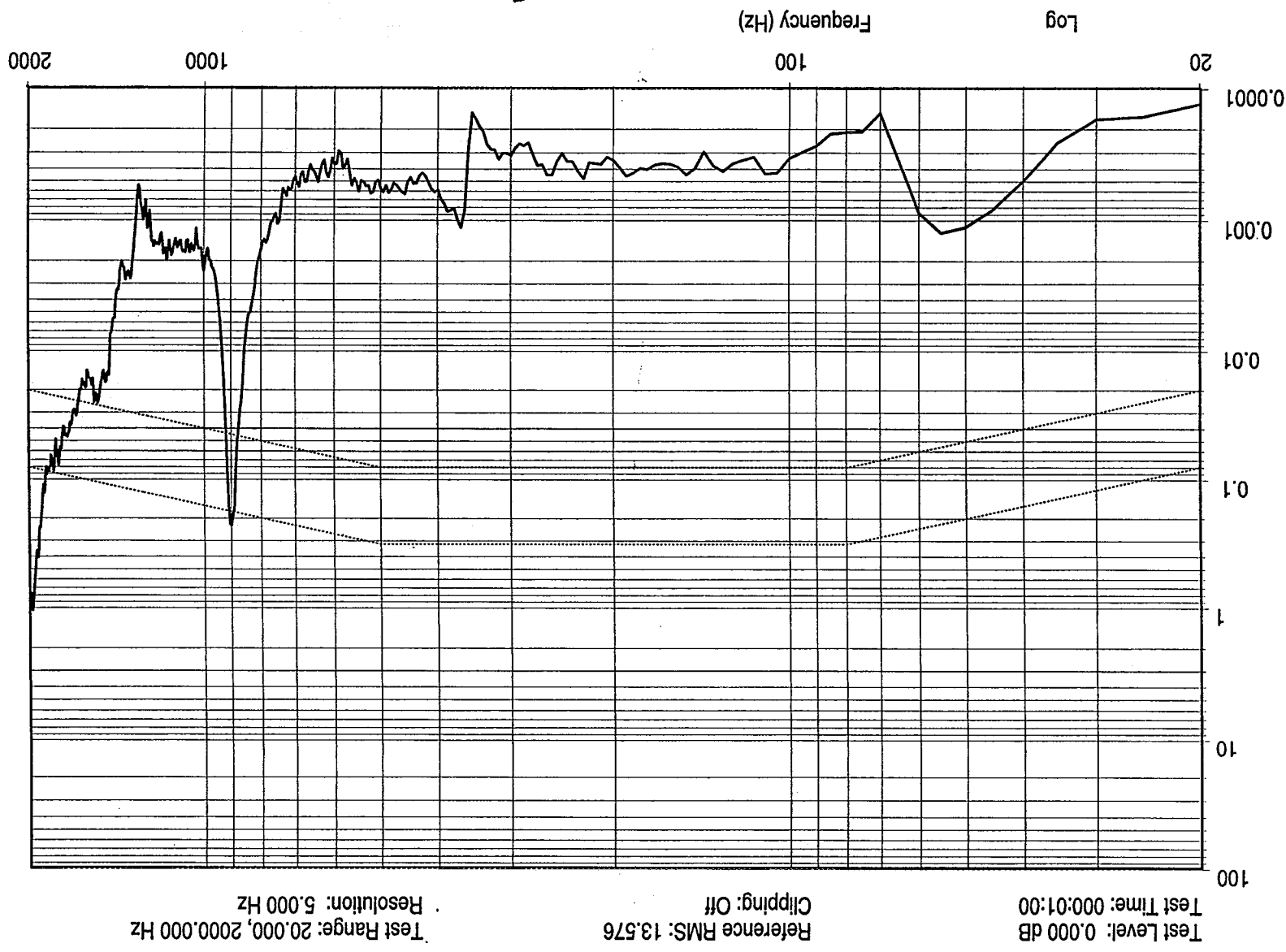
APR 07 1998
ENG
229
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UNIT X AXIS

10:09:18
07-Apr-1998

Test Name: PLO.tmp
X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360
AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615

UNIT Z AXIS
APR 0 1 1998
ENG 229
7A 161



Log
g_z/Hz
DOF 120
RMS:
9.652 g

Auxiliary
Chan. 3

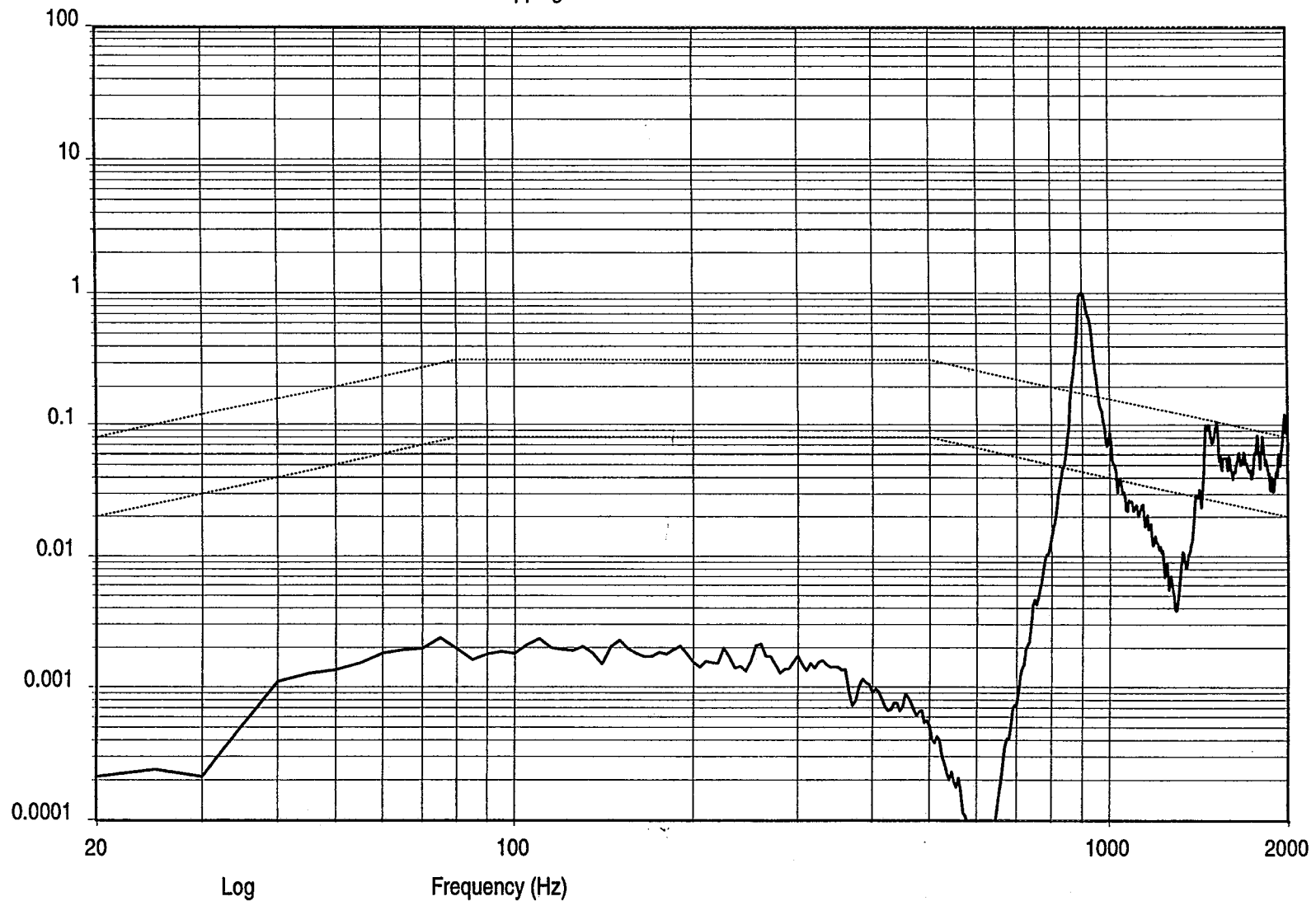
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 4

Log
 g^2/Hz
DOF 120
RMS:
10.292 g



10:09:22
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360
Test Name: PLO.tmp

APR 07 1998
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UNIT Y AXIS

Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 09:49:32

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping:

Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Abs (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT X AXIS	
3	Auxiliary	No	10.00	UNIT Z AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	No
H(f) Response Reference Label	
Pair Channel Channel	
1 3 2	3/CONTROL
2 4 2	4/CONTROL
3 5 2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
 Title 2: X AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

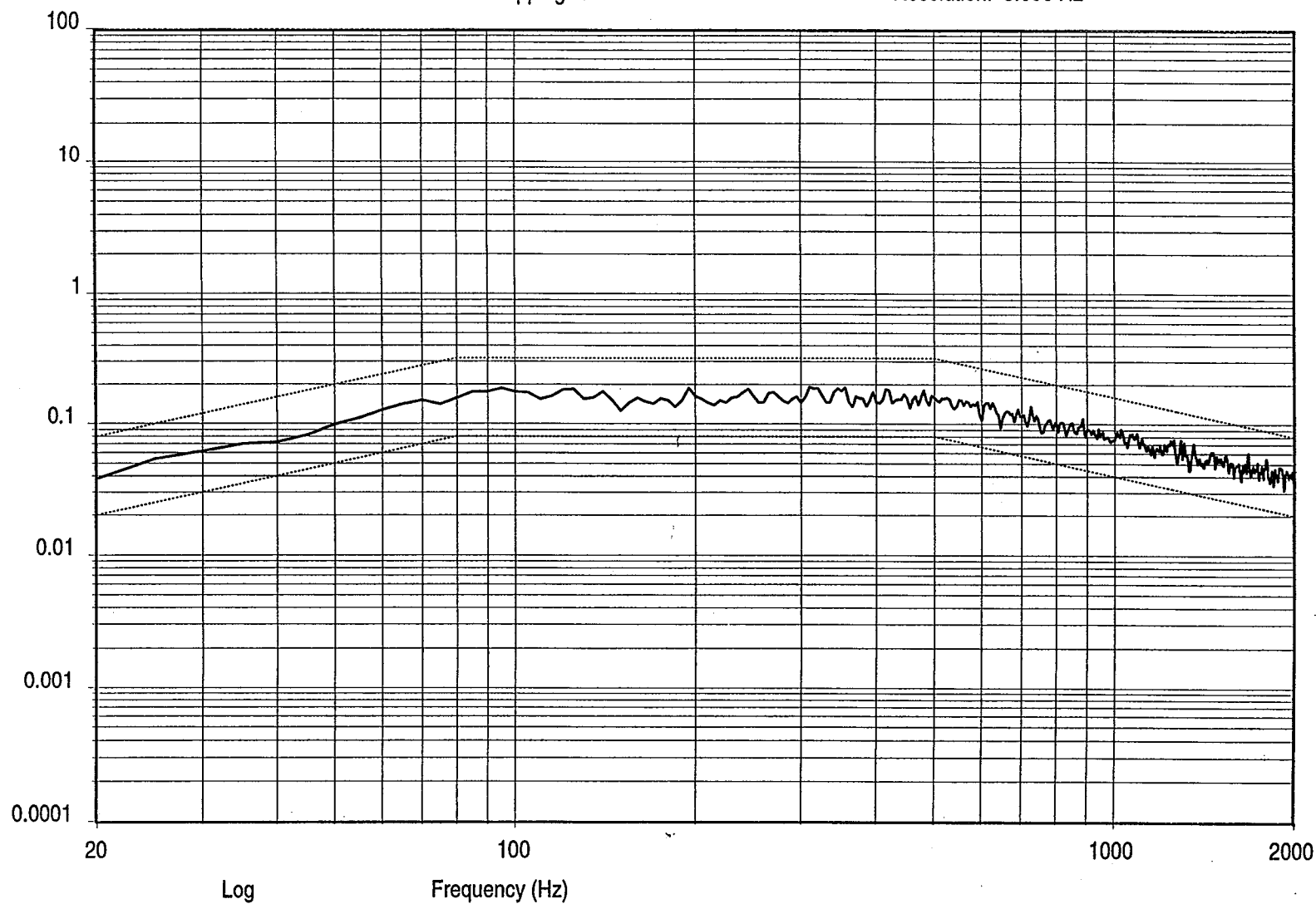
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

Log
 g^2/Hz

DOF 200

RMS:
13.521 g



13:18:28
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Y AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

ENG
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4/7/98

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7A

4-4-98

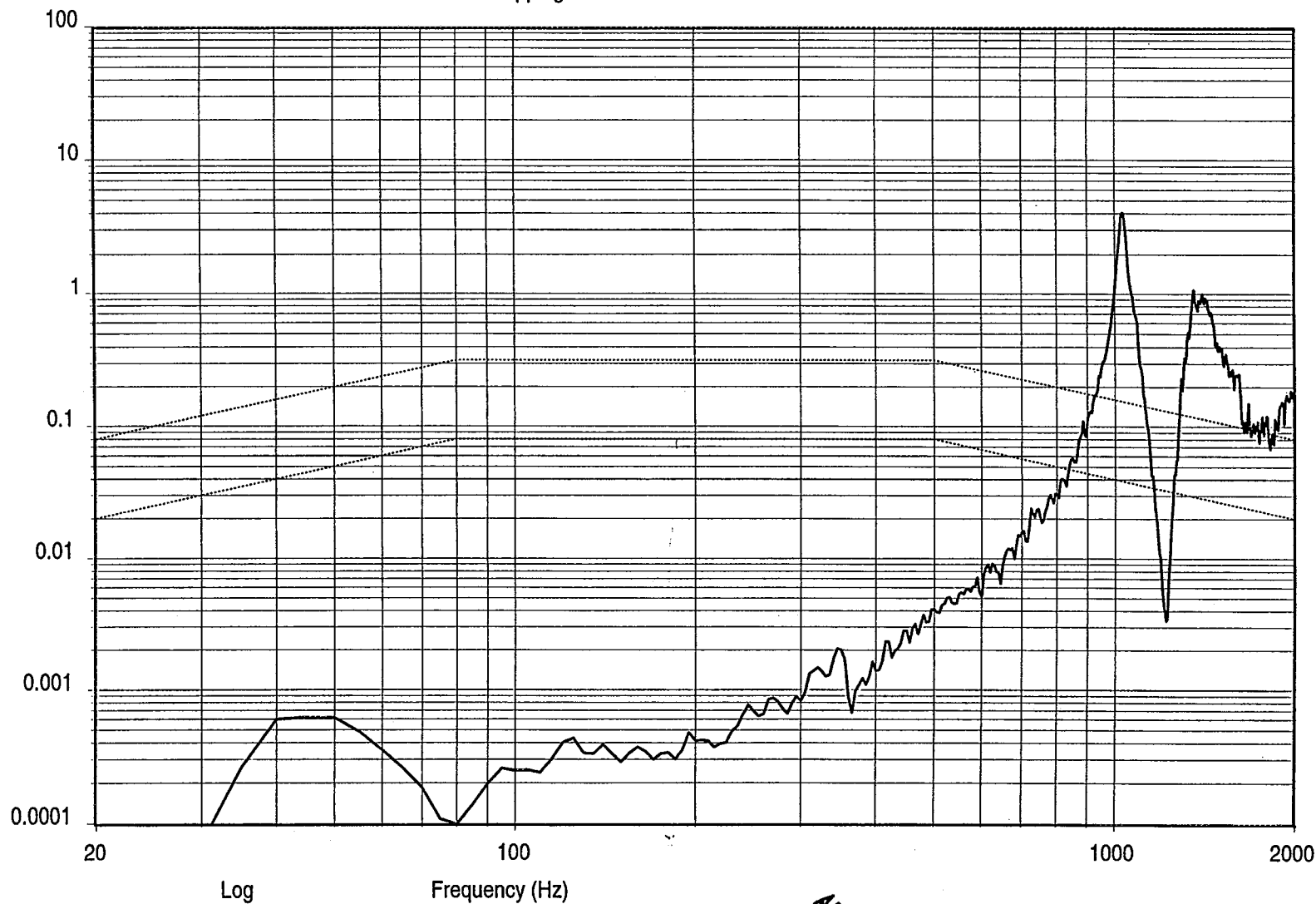
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 2

Log
 g^2/Hz
DOF 120
RMS:
21.303 g



13:18:42
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Y AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

APR 07 1998
UNIT X AXIS
ENG 229
13:18

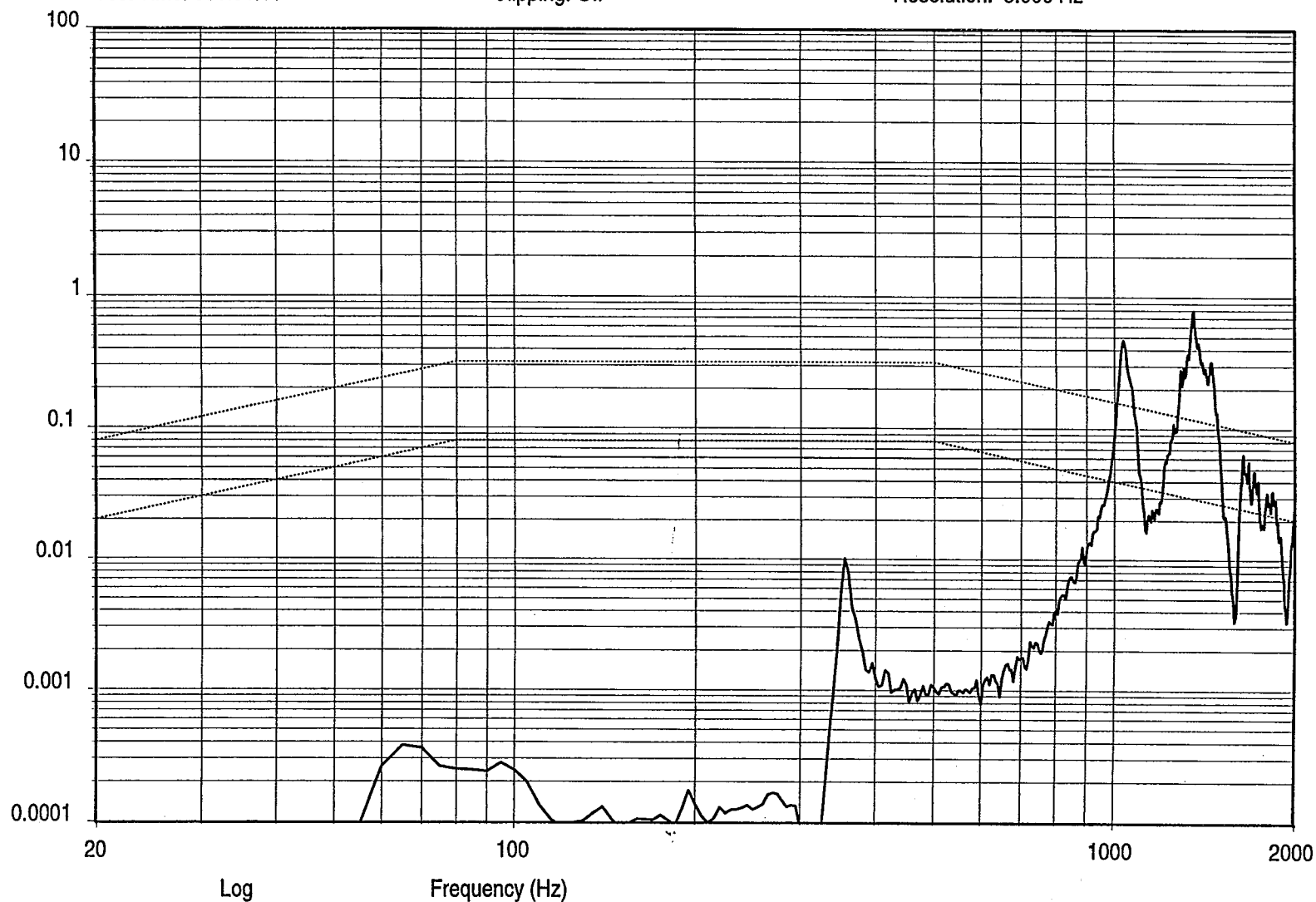
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 3

Log
 g^2/Hz
DOF 120
RMS:
10.896 g



13:18:32
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Y AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

APR 07 1998
ENG 229

UNIT Z AXIS

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

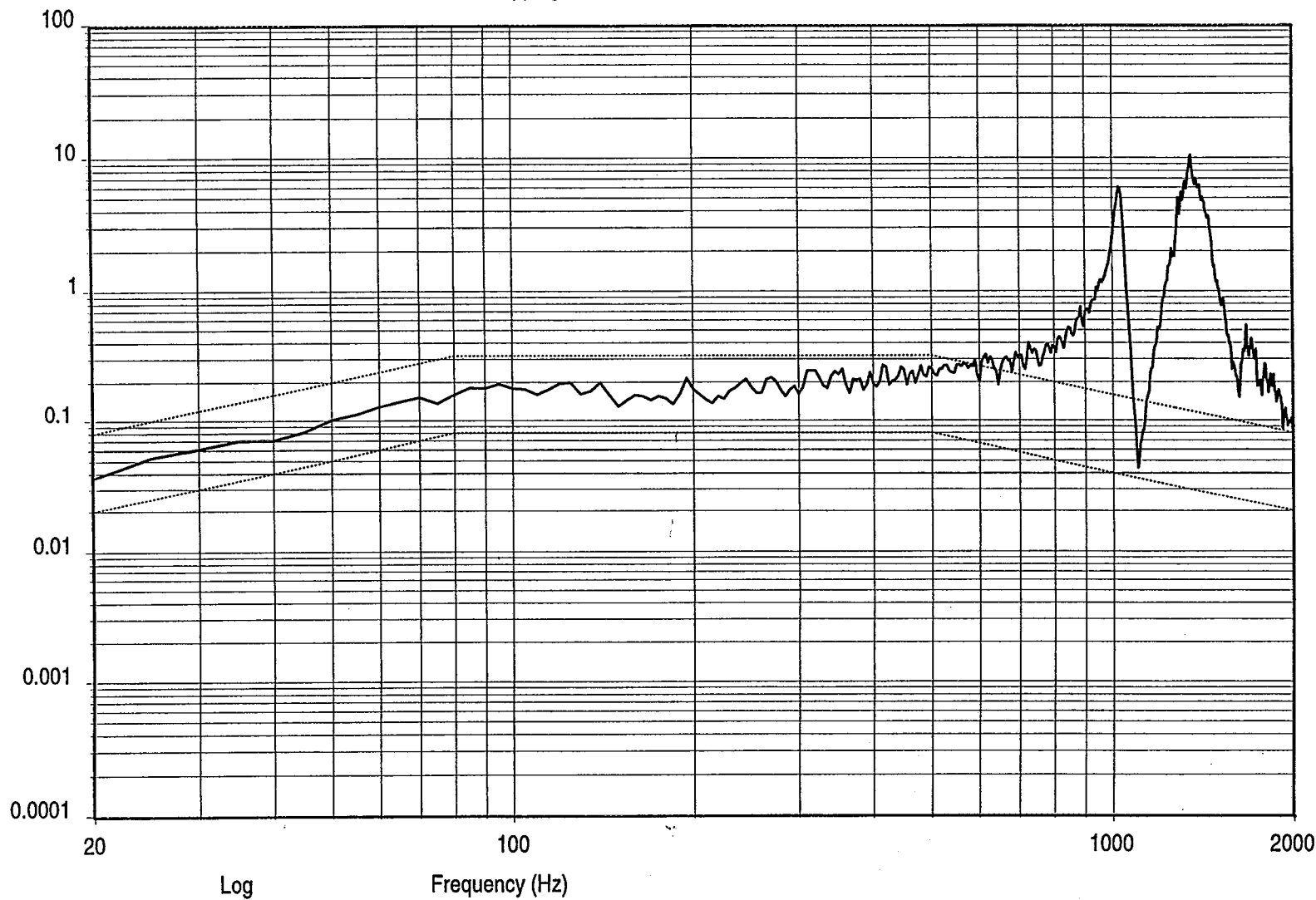
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 4

Log
 g^2/Hz

DOF 120

RMS:
44.048 g



13:18:37
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618, S/O 431615
Y AXIS TEST S/N F04, F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.tmp

UNIT Y AXIS
APR 07 1998
ENG 229

Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 13:11:52

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping: Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Abort (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT X AXIS	
3	Auxiliary	No	10.00	UNIT Z AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: No

H(f) Pair	Response Channel	Reference Channel	Label
1	3	2	3/CONTROL
2	4	2	4/CONTROL
3	5	2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615

Title 2: Y AXIS TEST S/N F04,F03 P/N 1348360-1, 1348360 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

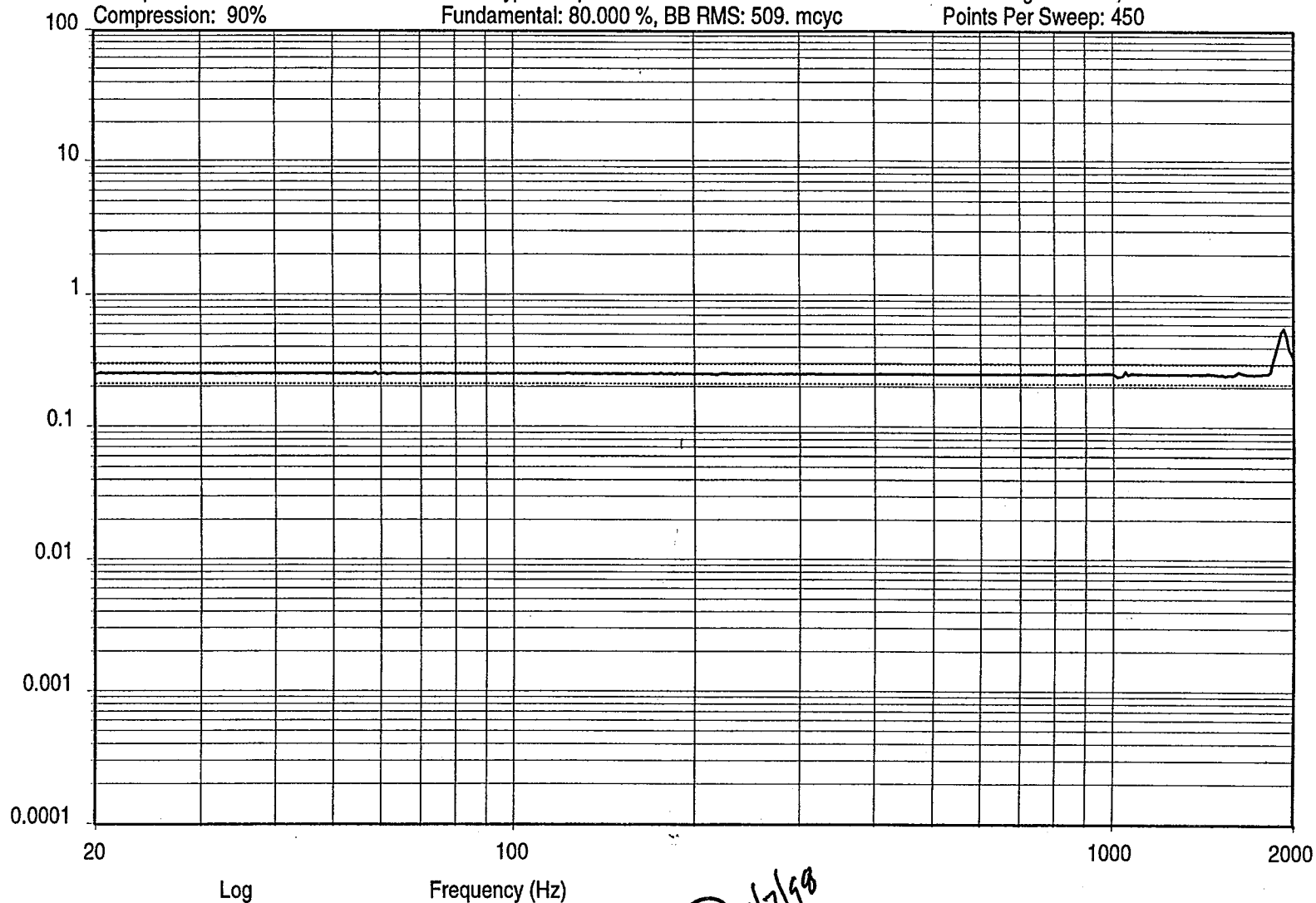
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



11:39:35
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



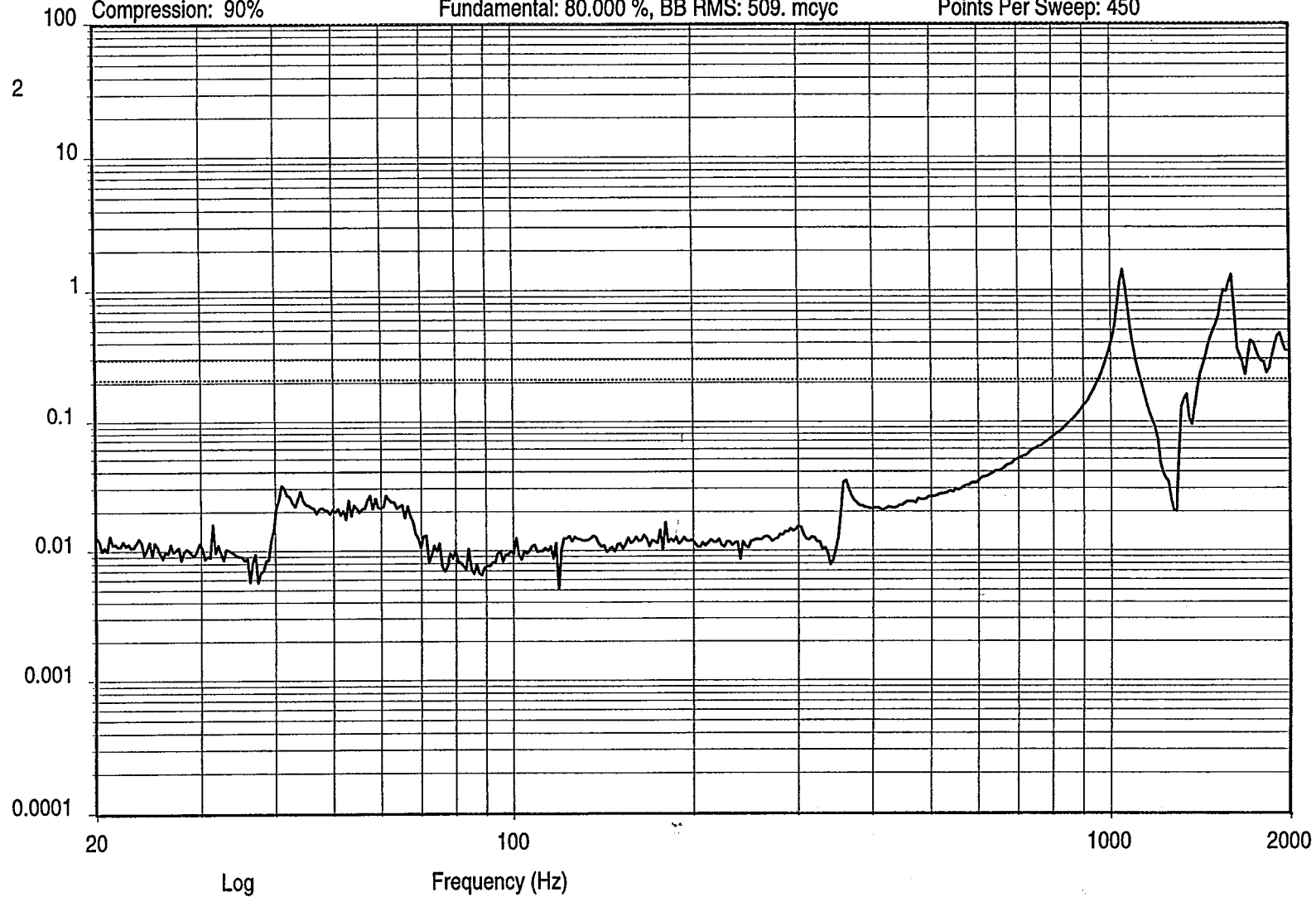
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

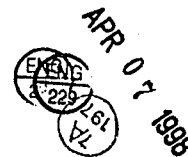
Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



11:39:45
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

3

Log
Acceleration
g (0-pk)

10
1
0.1
0.01
0.001
0.0001

20

100

1000

2000

Log

Frequency (Hz)

Z AXIS

11:39:37
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



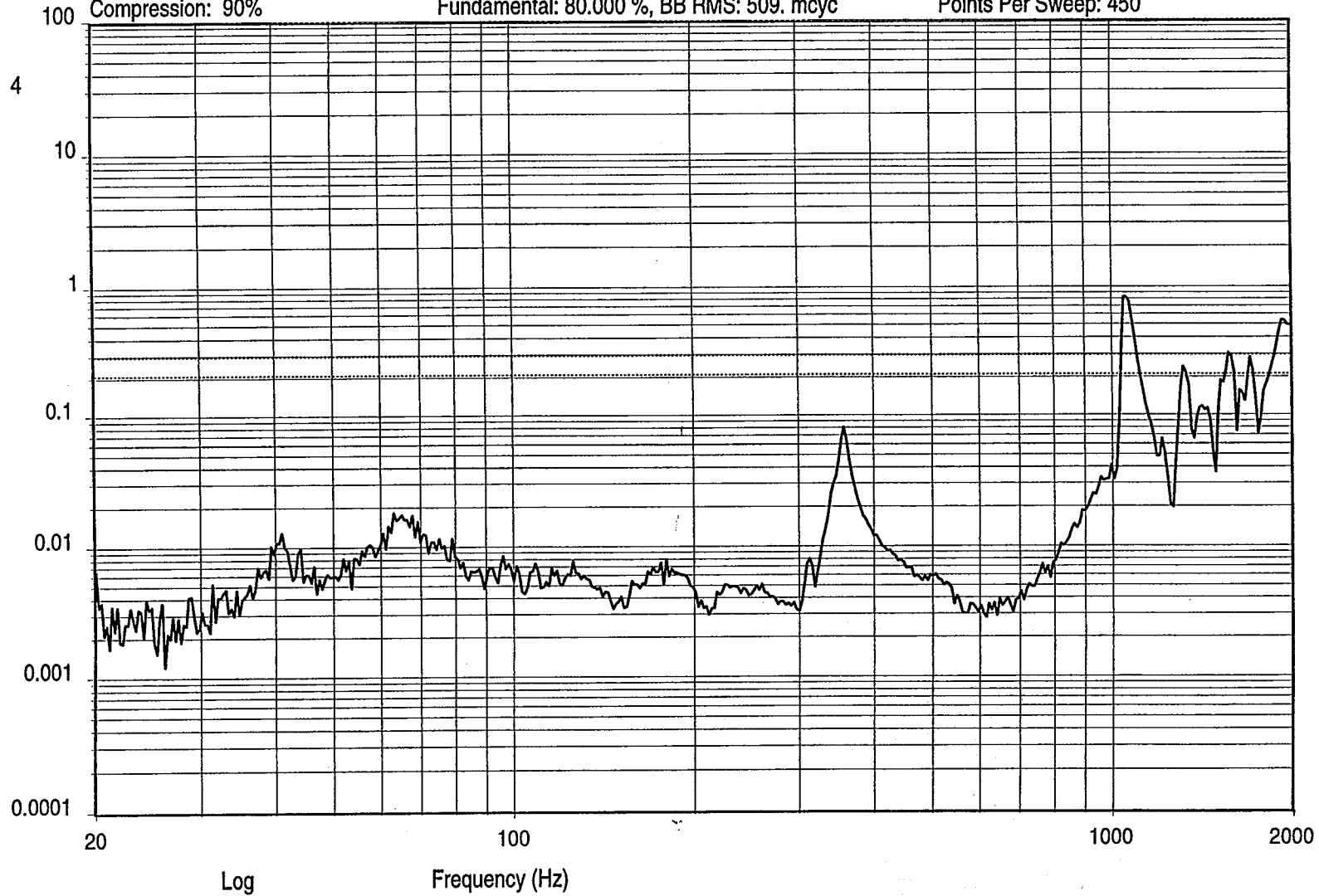
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

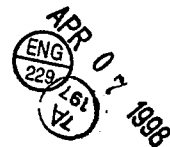
Log
Acceleration
g (0-pk)



11:39:41
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

Y AXIS



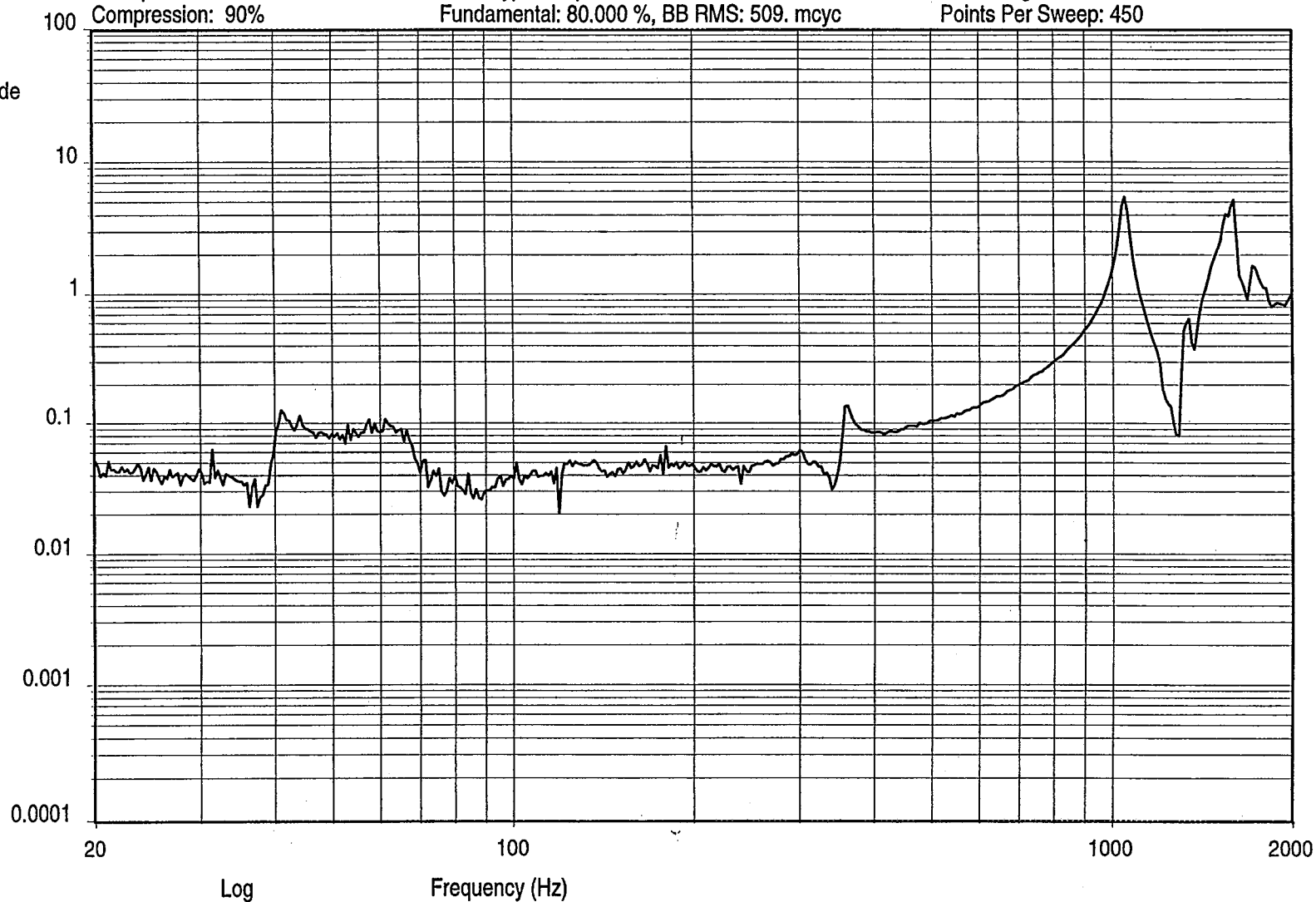
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

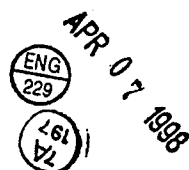
Log
Ratio



11:40:00
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

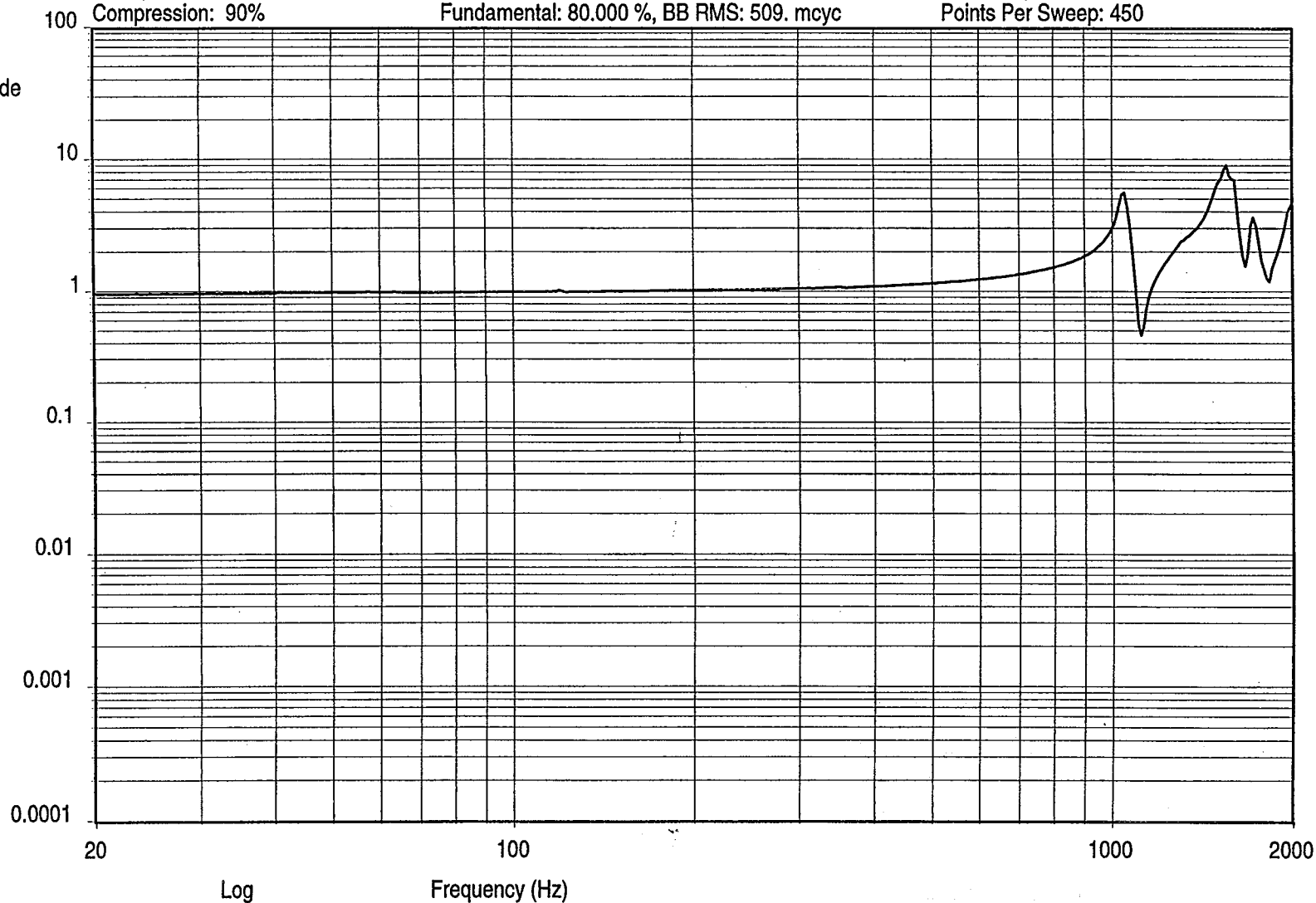
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log

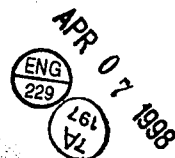
Ratio



11:40:04
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

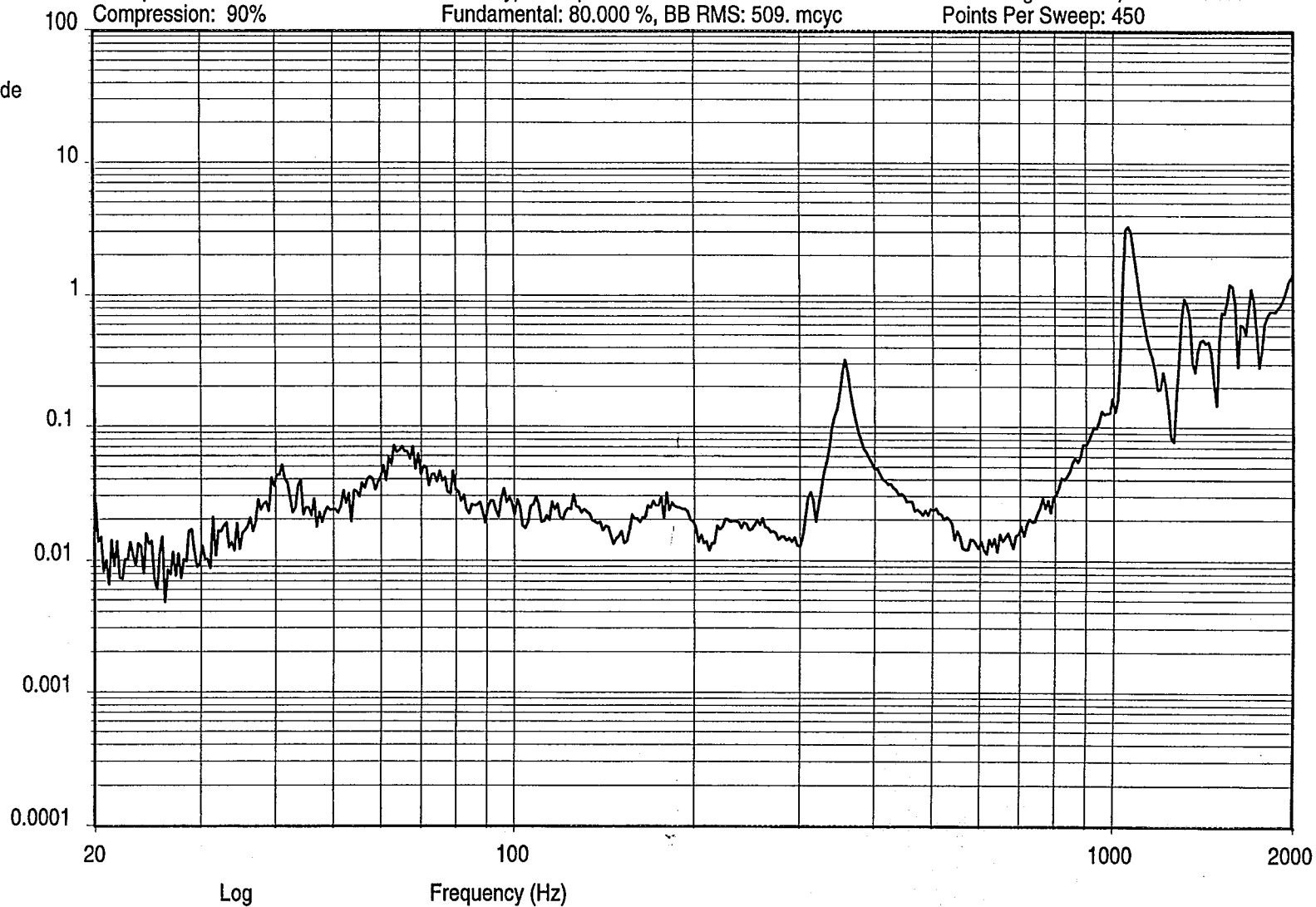
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log

Ratio



11:40:08
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

4/ CONTROL



Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 11:30:34

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation
1	Control	Yes	100.00	CONTROL
2	Auxiliary	No	10.00	X AXIS
3	Auxiliary	No	10.00	Z AXIS
4	Auxiliary	No	10.00	Y AXIS

Label 2

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -
 Title 1: AMSU PLO S/O 431615,P/N 1348360-1
 Title 2: POST Z SINE SWEEP S/N F03 METSAT
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Off
 Message Log -
 Log Mode: Off
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

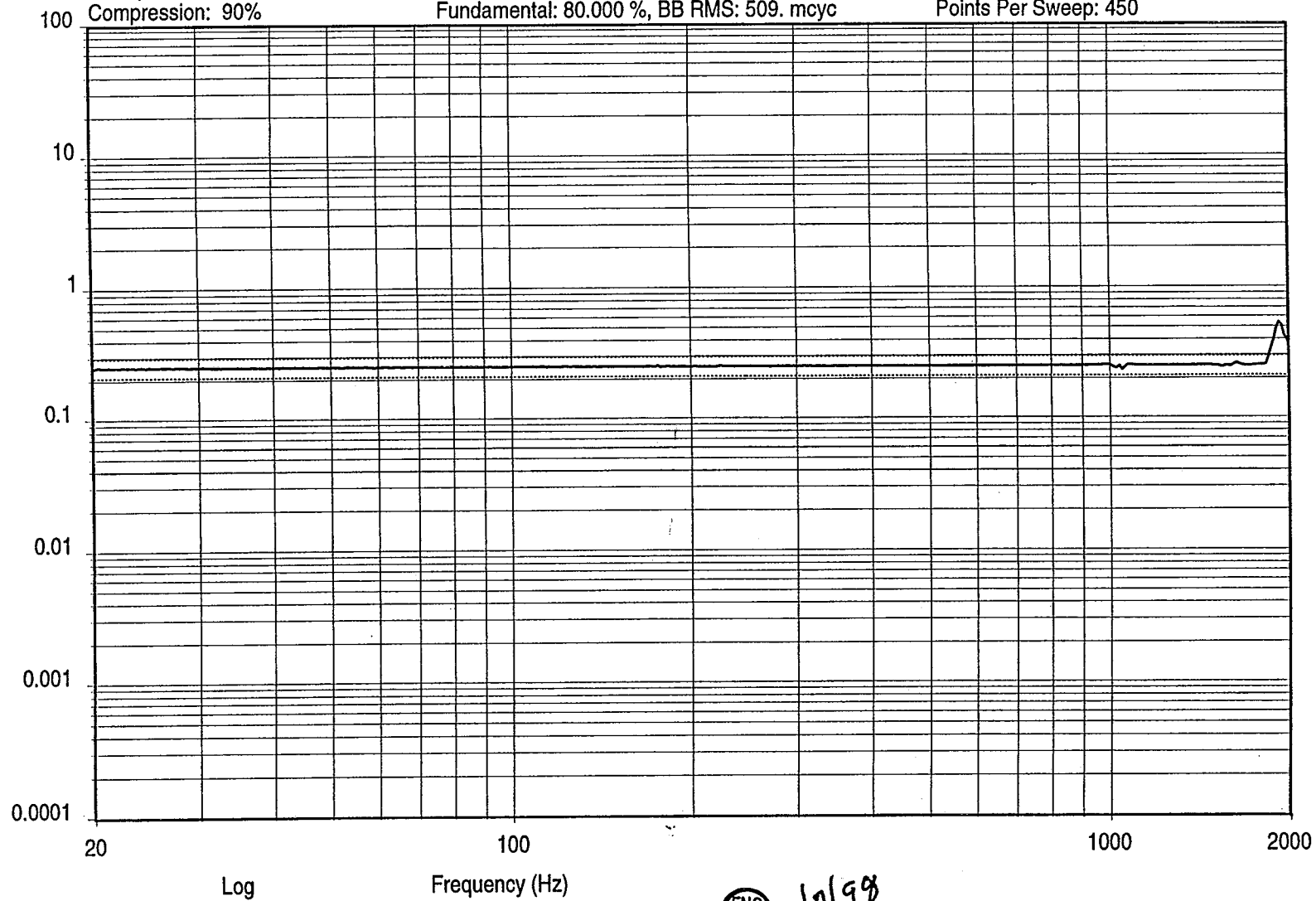
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



11:16:53
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229 4/7/98

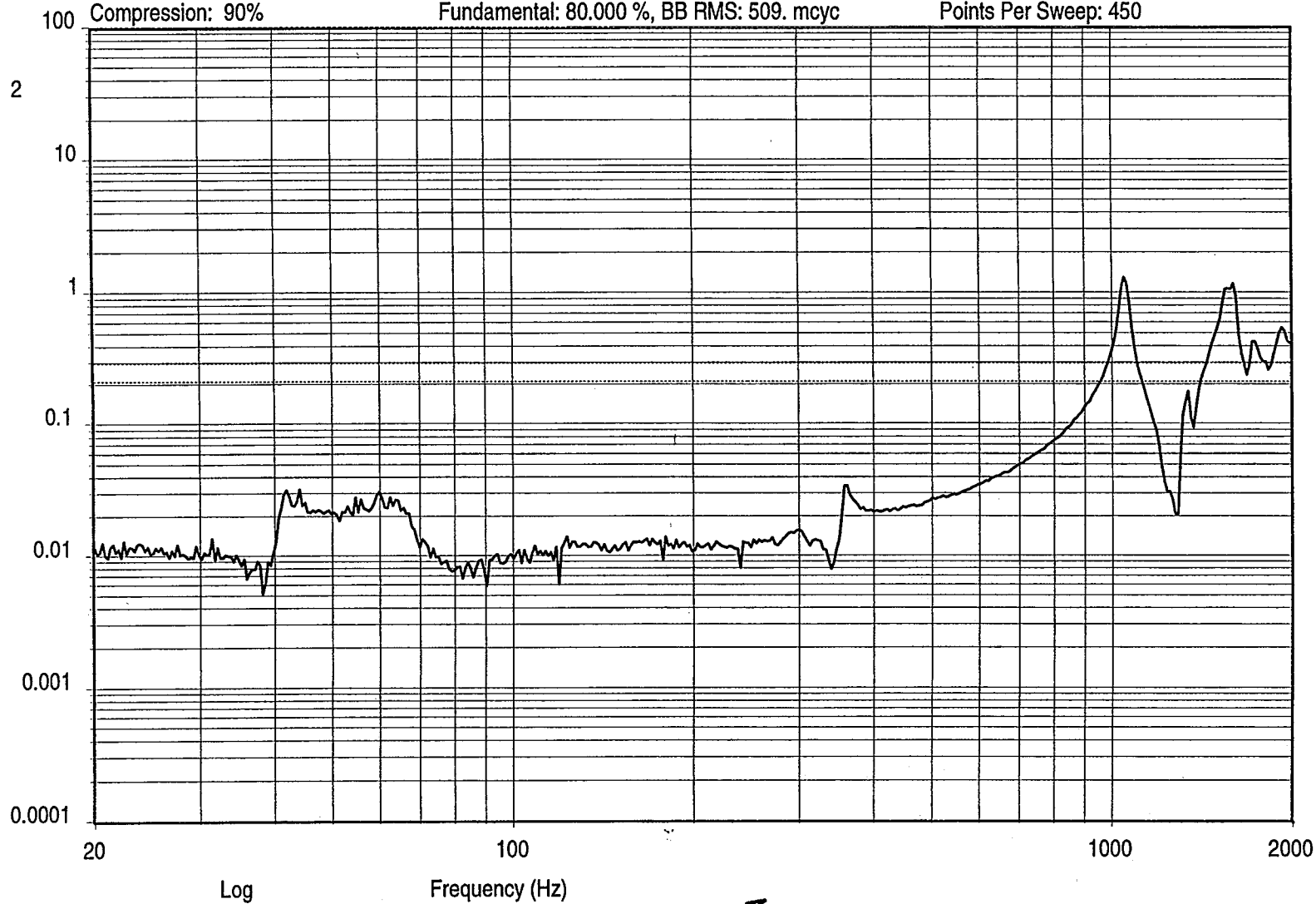
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



11:16:59
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998
ENG 229
197

X AXIS

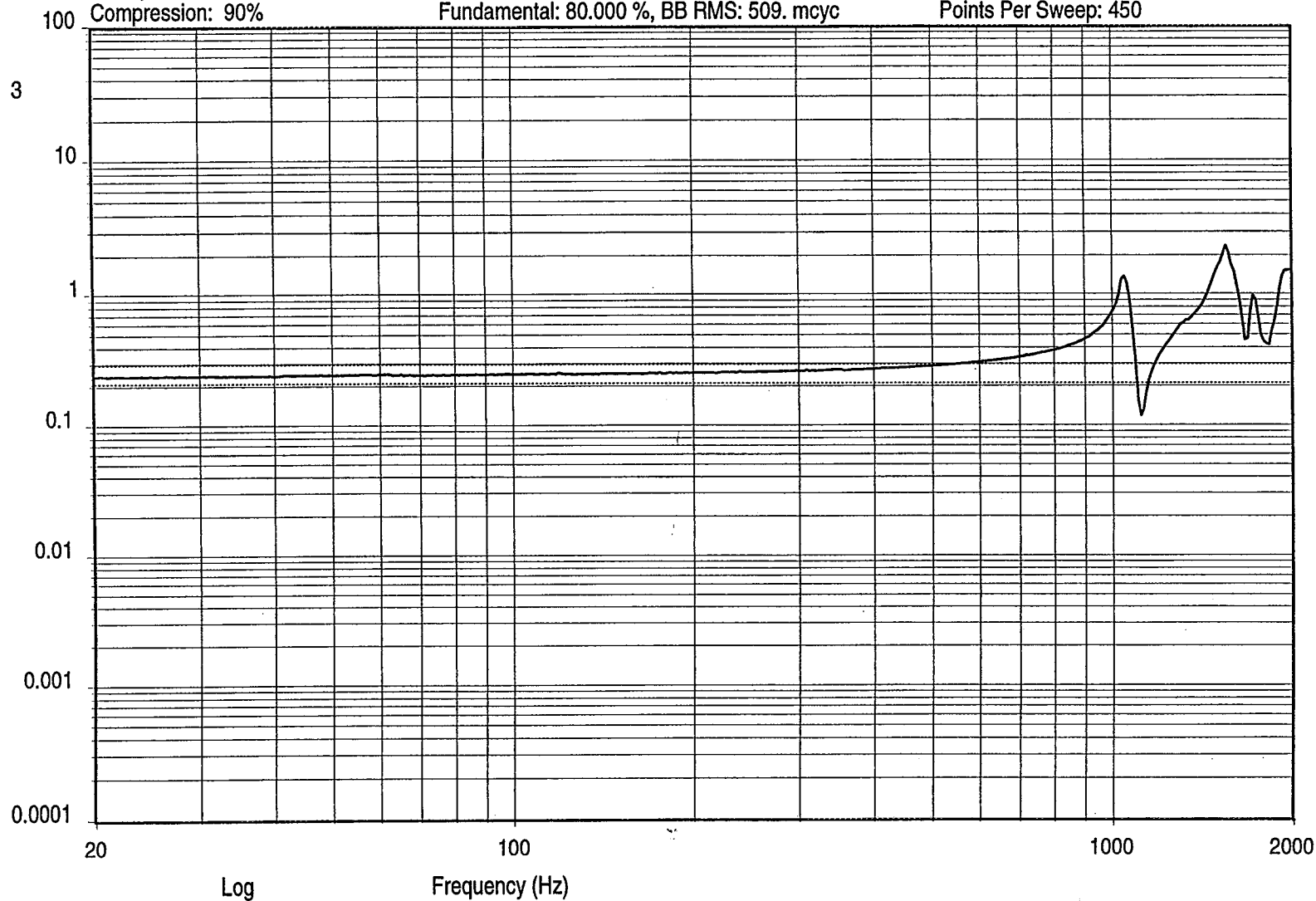
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



11:16:56
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

Z AXIS



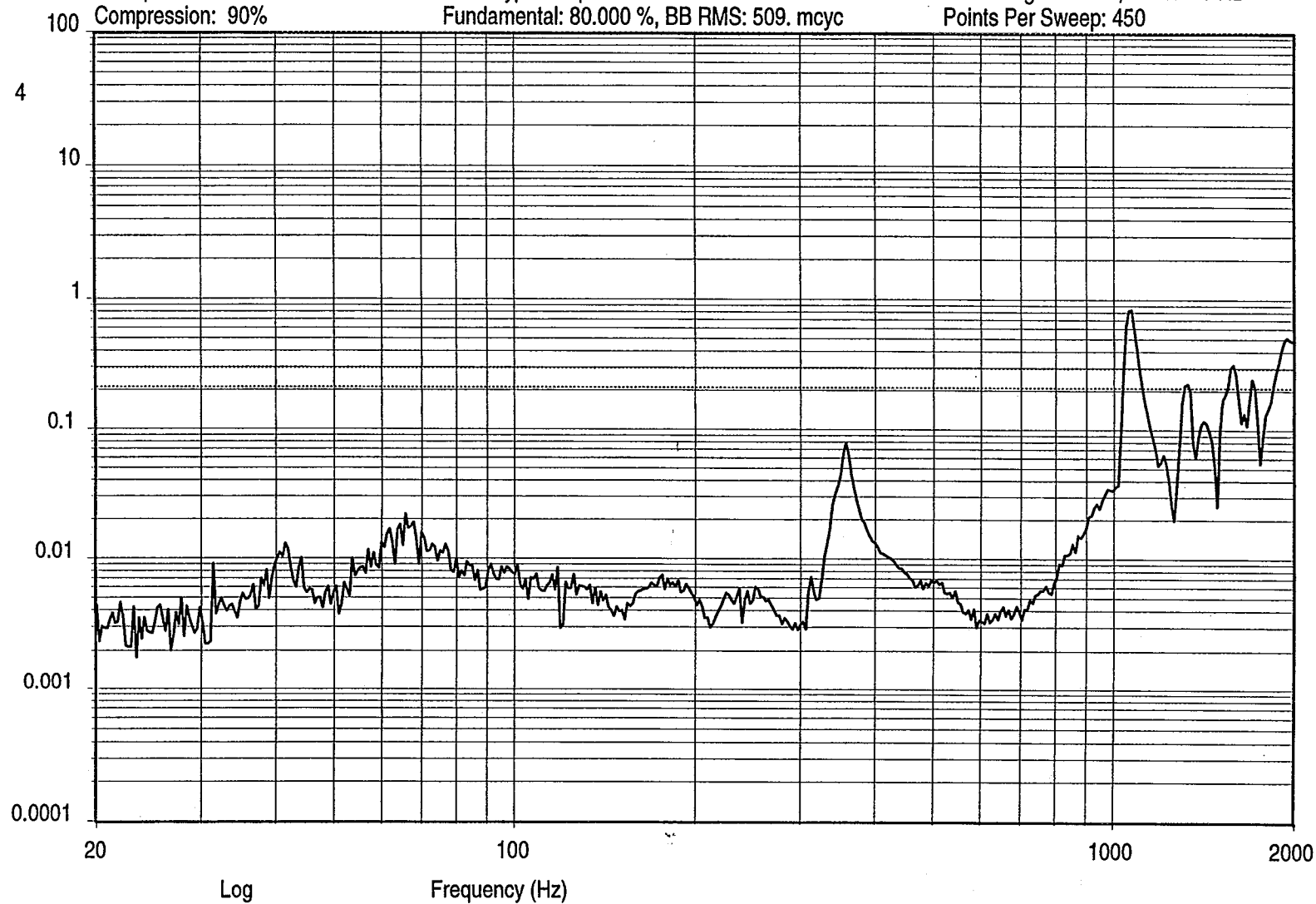
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



11:17:04
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

Y AXIS



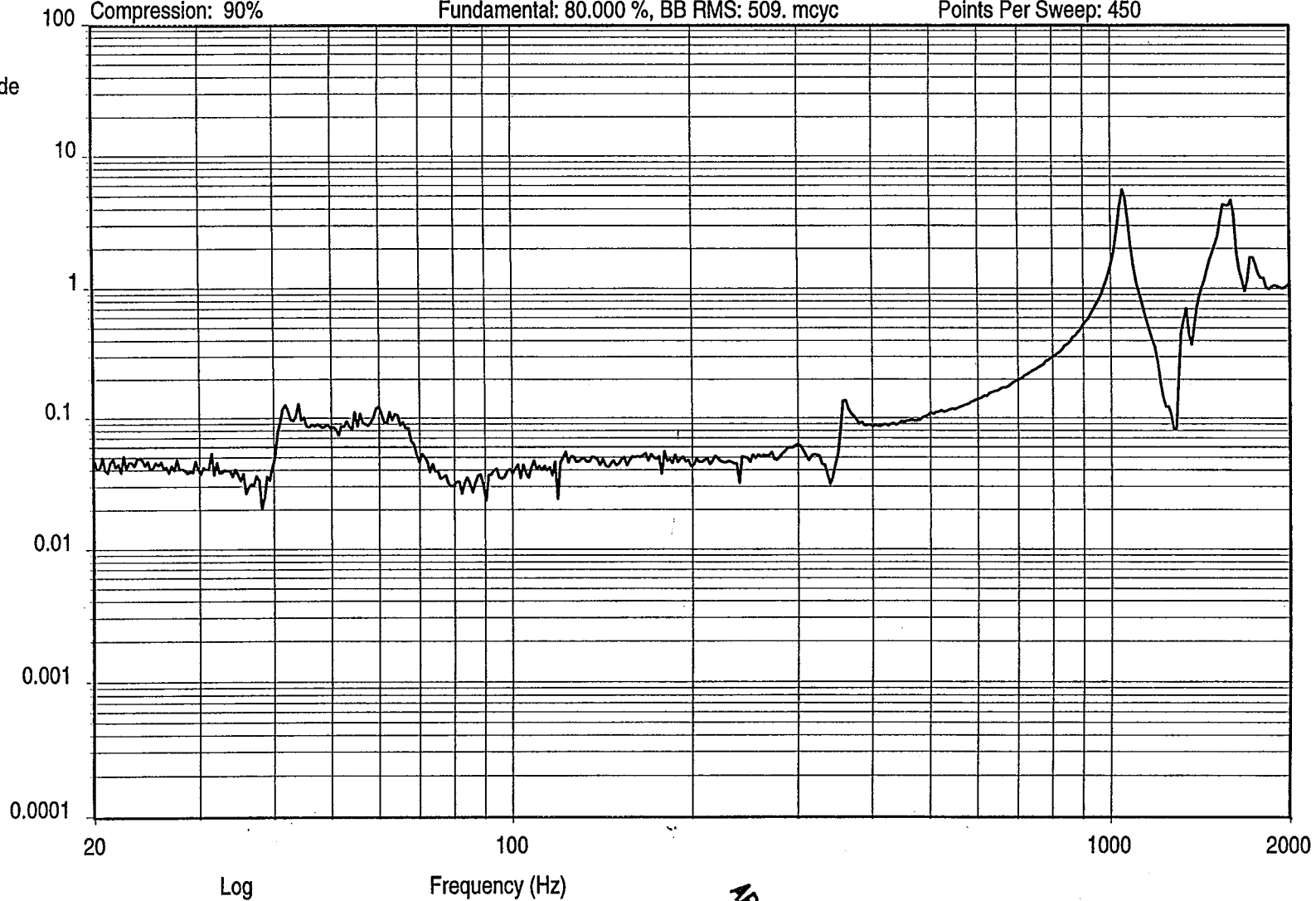
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



11:18:15
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

2/CONTROL

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

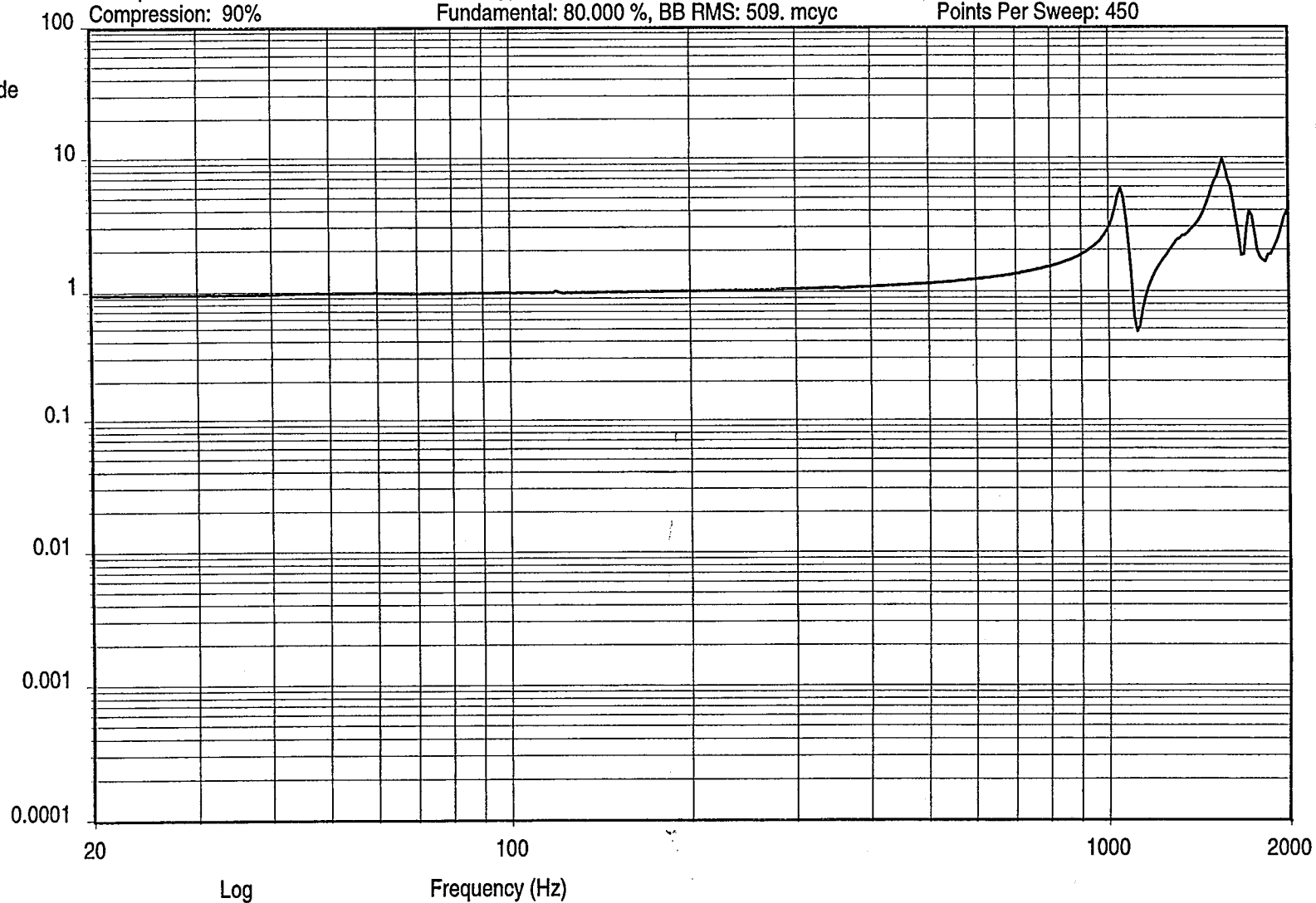
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log

Ratio



11:18:19
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

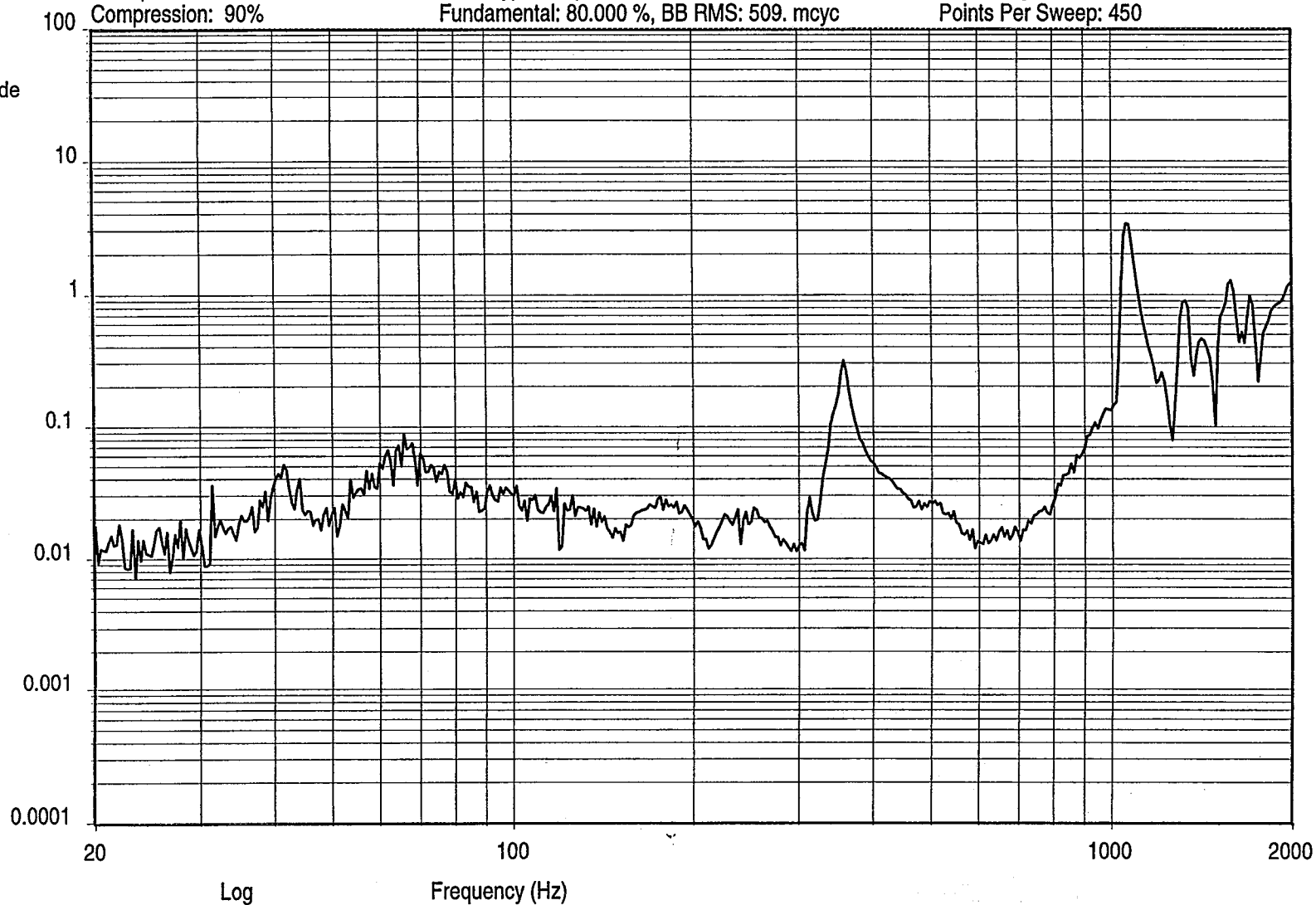
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4/Ch 1

Log

Ratio



11:18:23
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
PRE Z SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

4/ CONTROL



Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 11:09:29

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
Reference CSL Threshold: 20.00 dB
CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
Frequency: 100.00 Hz
Maximum Drive: 100.00 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation Label
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	X AXIS	
3	Auxiliary	No	10.00	Z AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -
Title 1: AMSU PLO S/O 431615,P/N 1348360-1
Title 2: PRE Z SINE SWEEP S/N F03 METSAT
List Only Text -
Title 3:
Prompt before Test: Yes
Data Storage -
Storage Mode: Off
Message Log -
Log Mode: Off
Printing -
Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

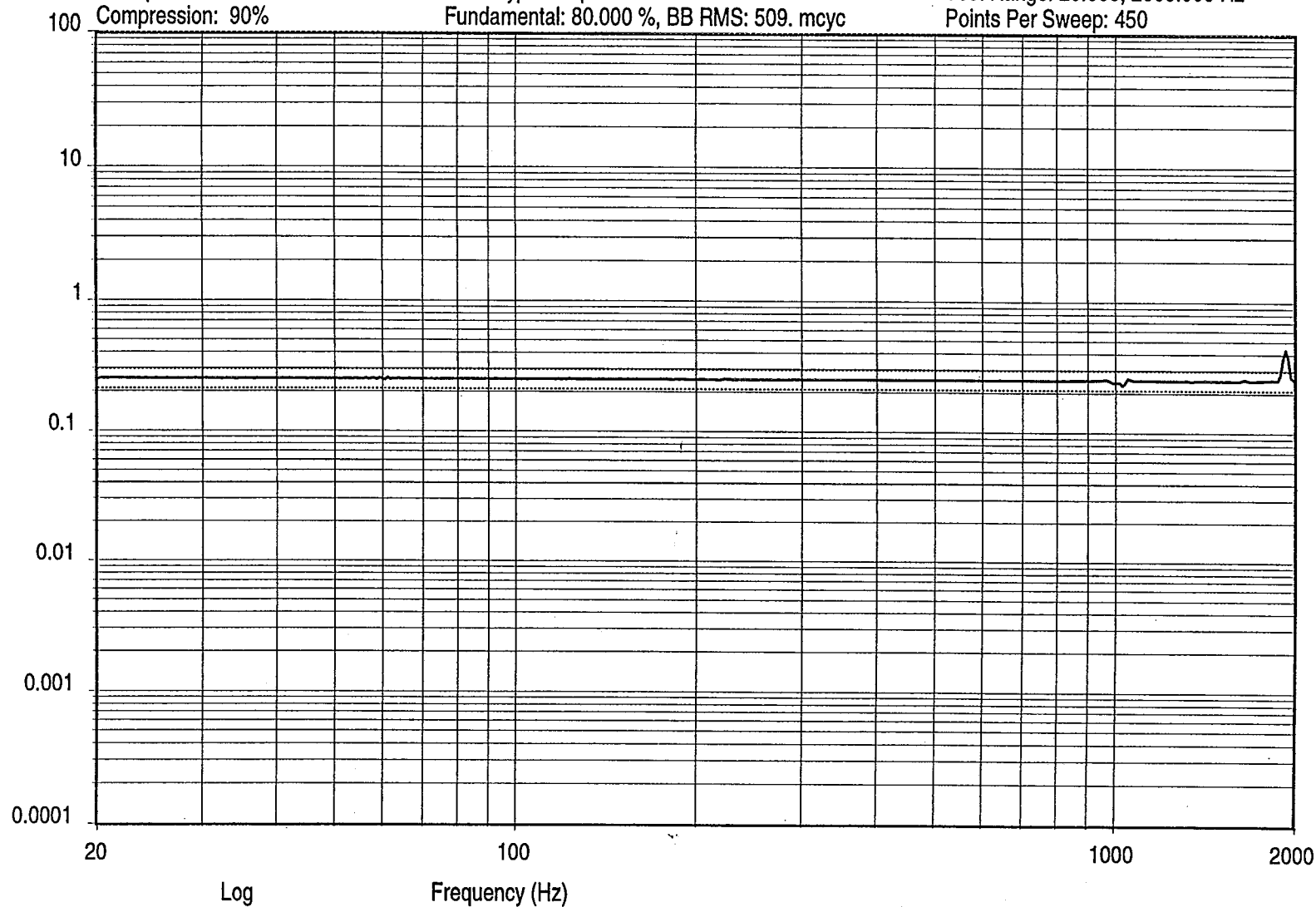
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



13:30:22
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229
4/7/98
167
24

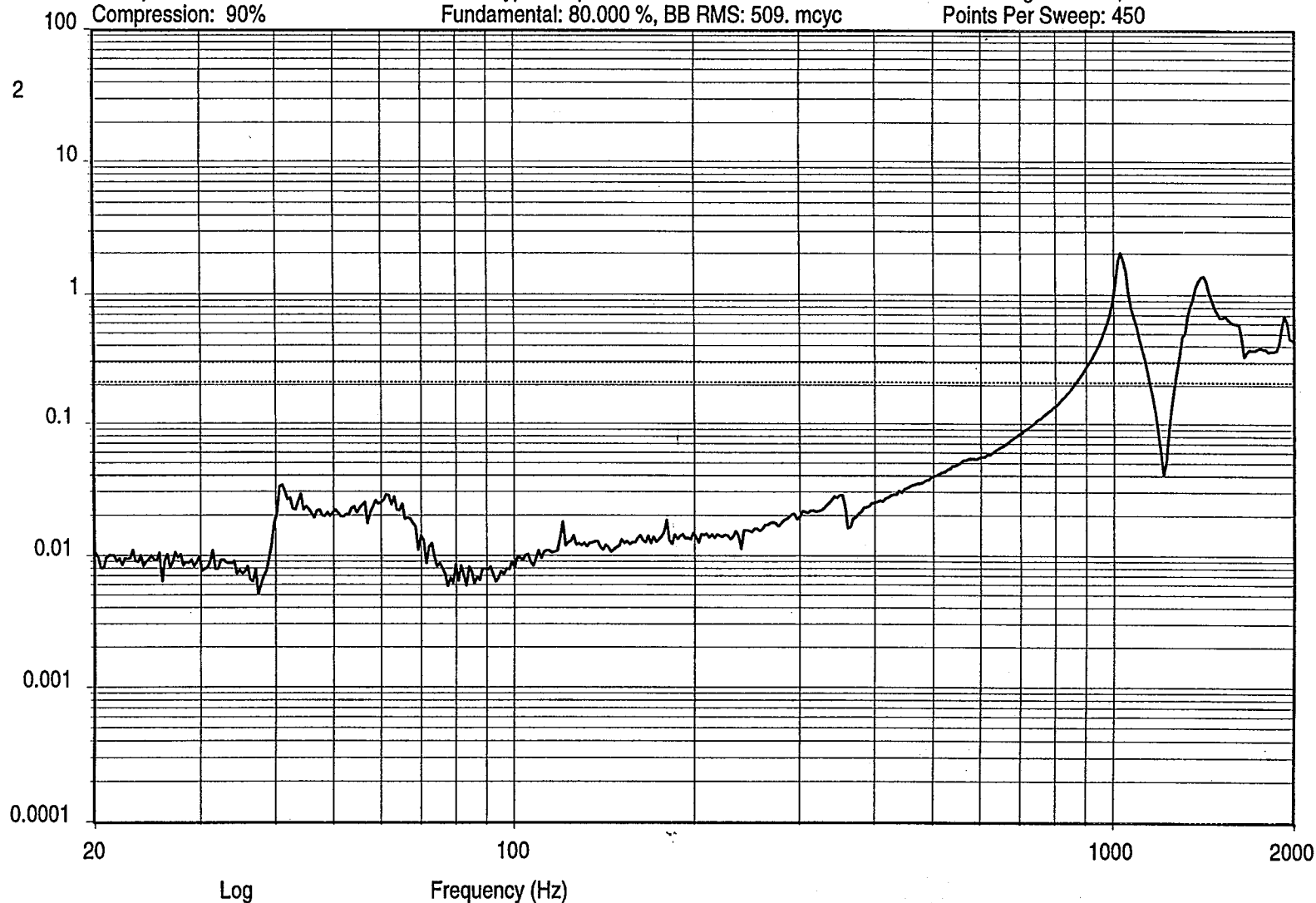
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



13:30:29
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

X AXIS

APR 07 1998
ENG 229
161

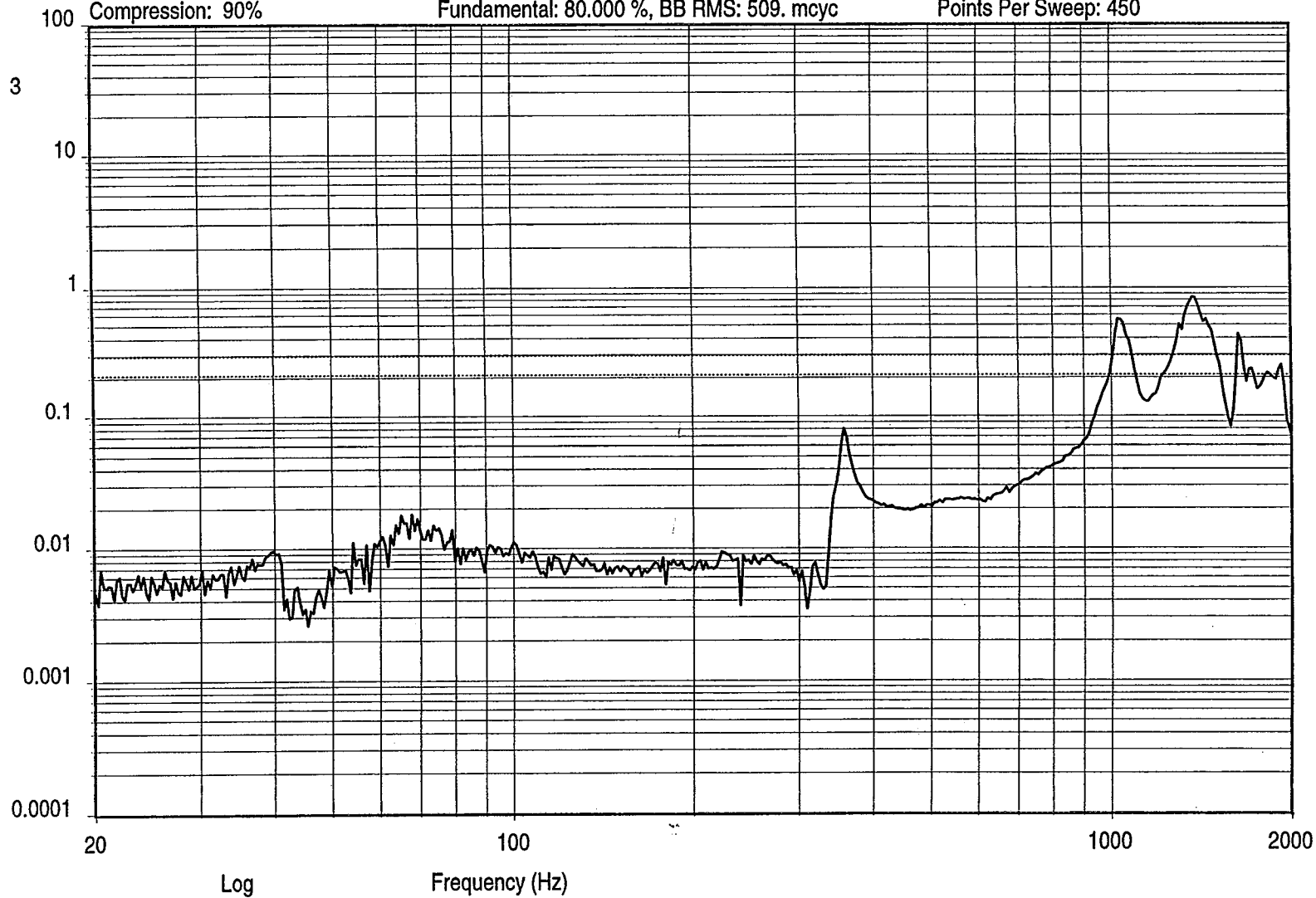
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



13:30:25
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998
ENG 229
74

Z AXIS

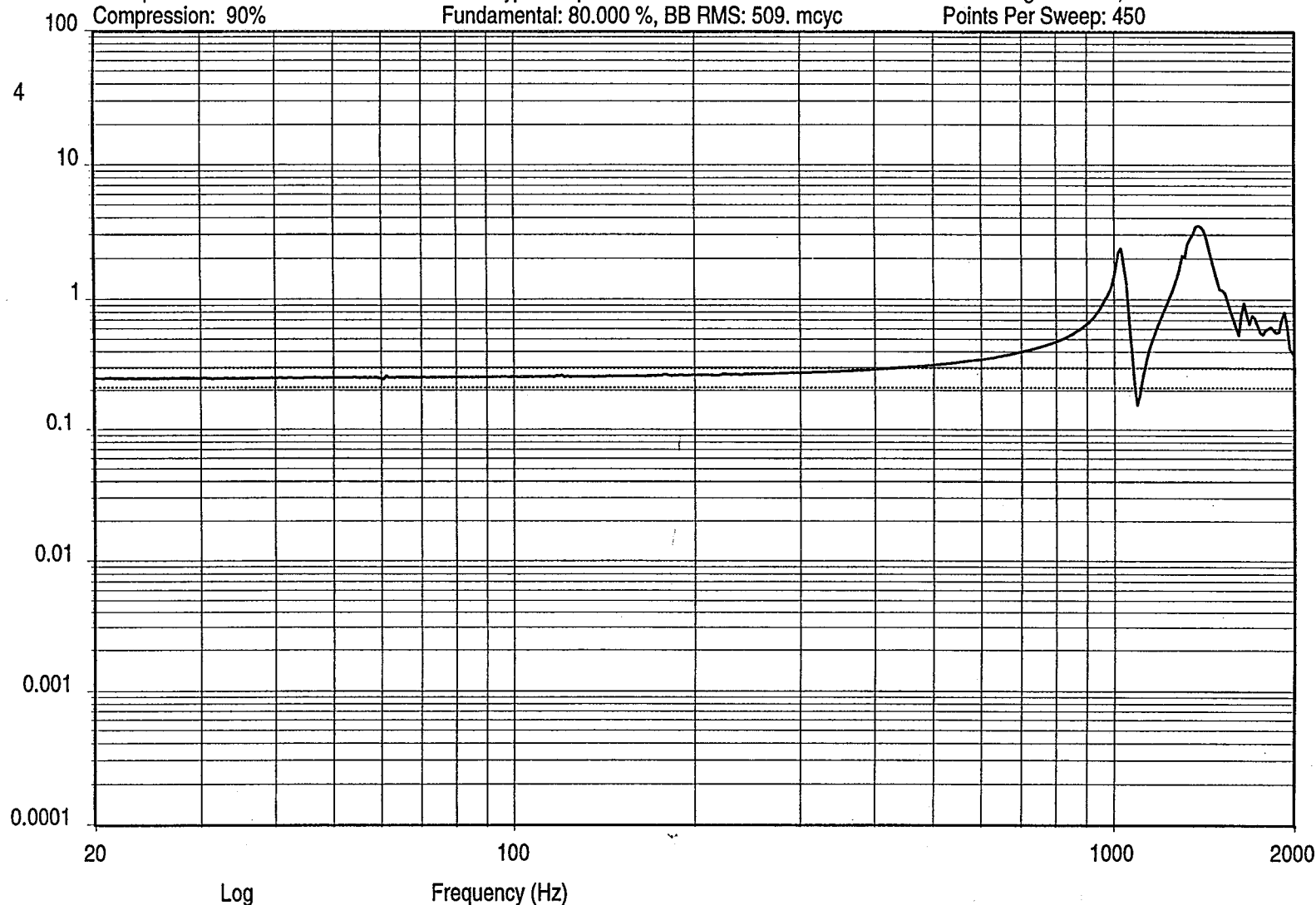
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



13:30:33
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

APR 07 1998
ENG 224
161
7A

Y AXIS

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

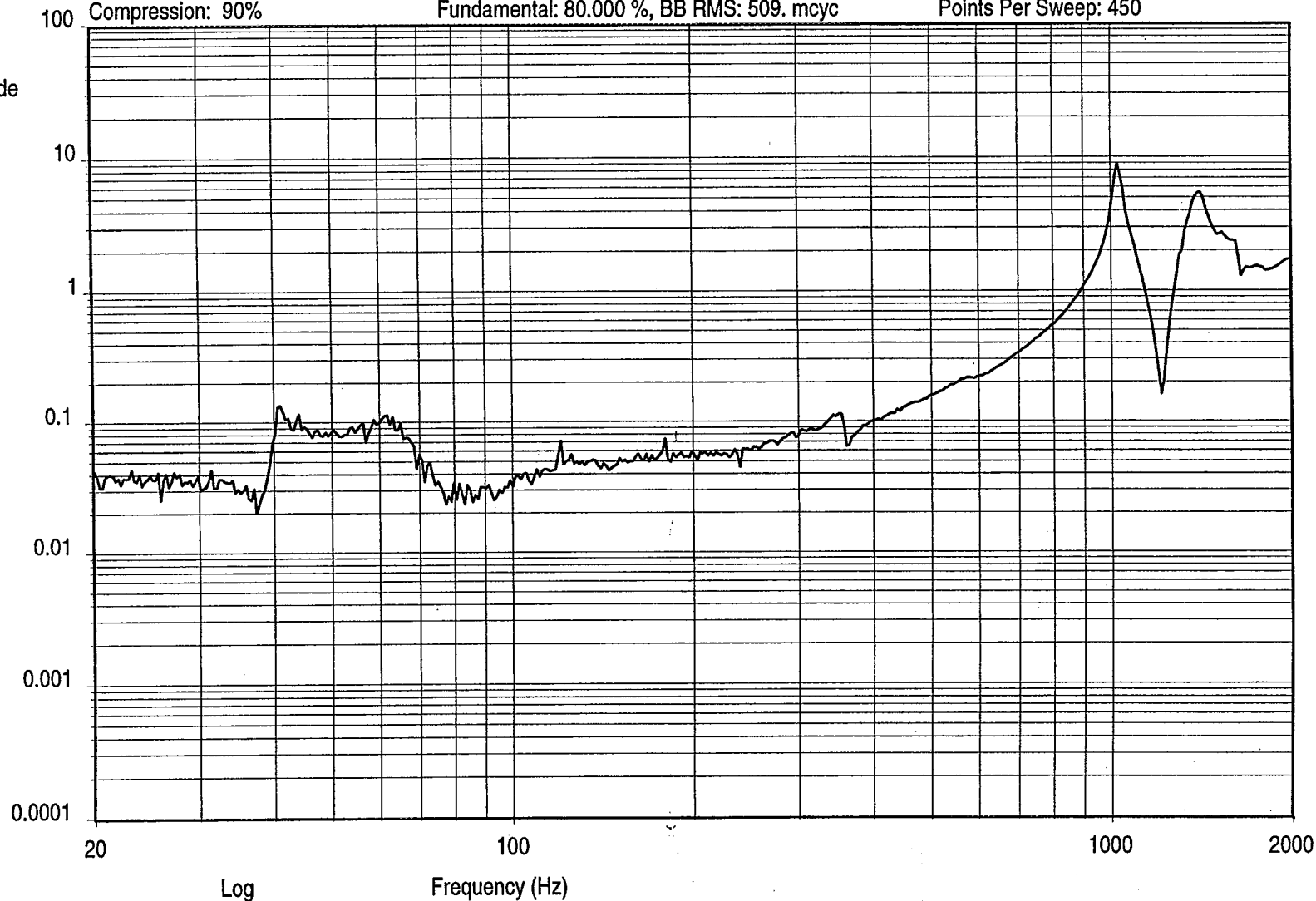
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log

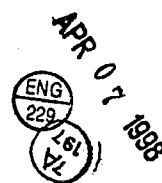
Ratio



13:30:57
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



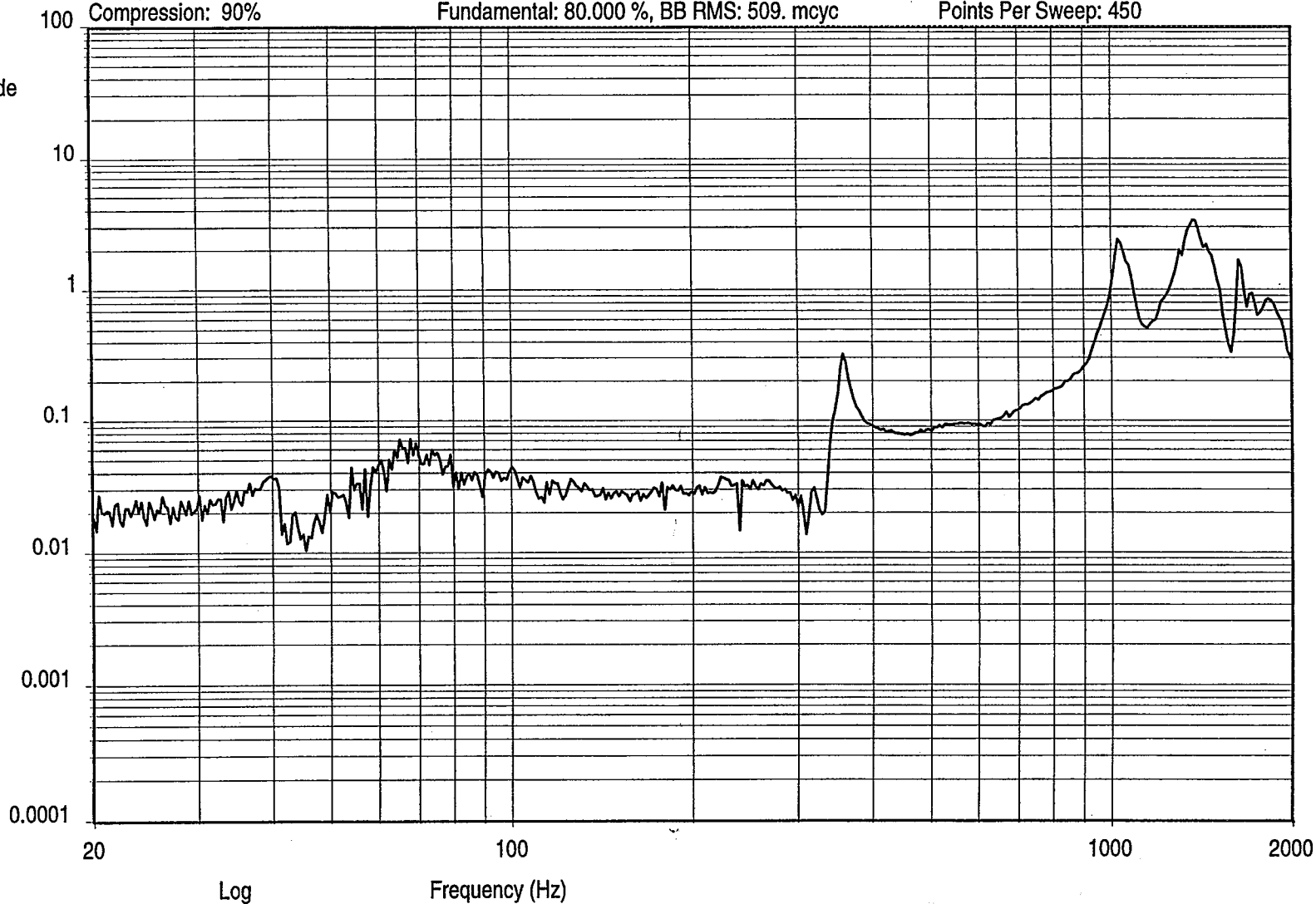
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log
Ratio



13:31:01
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



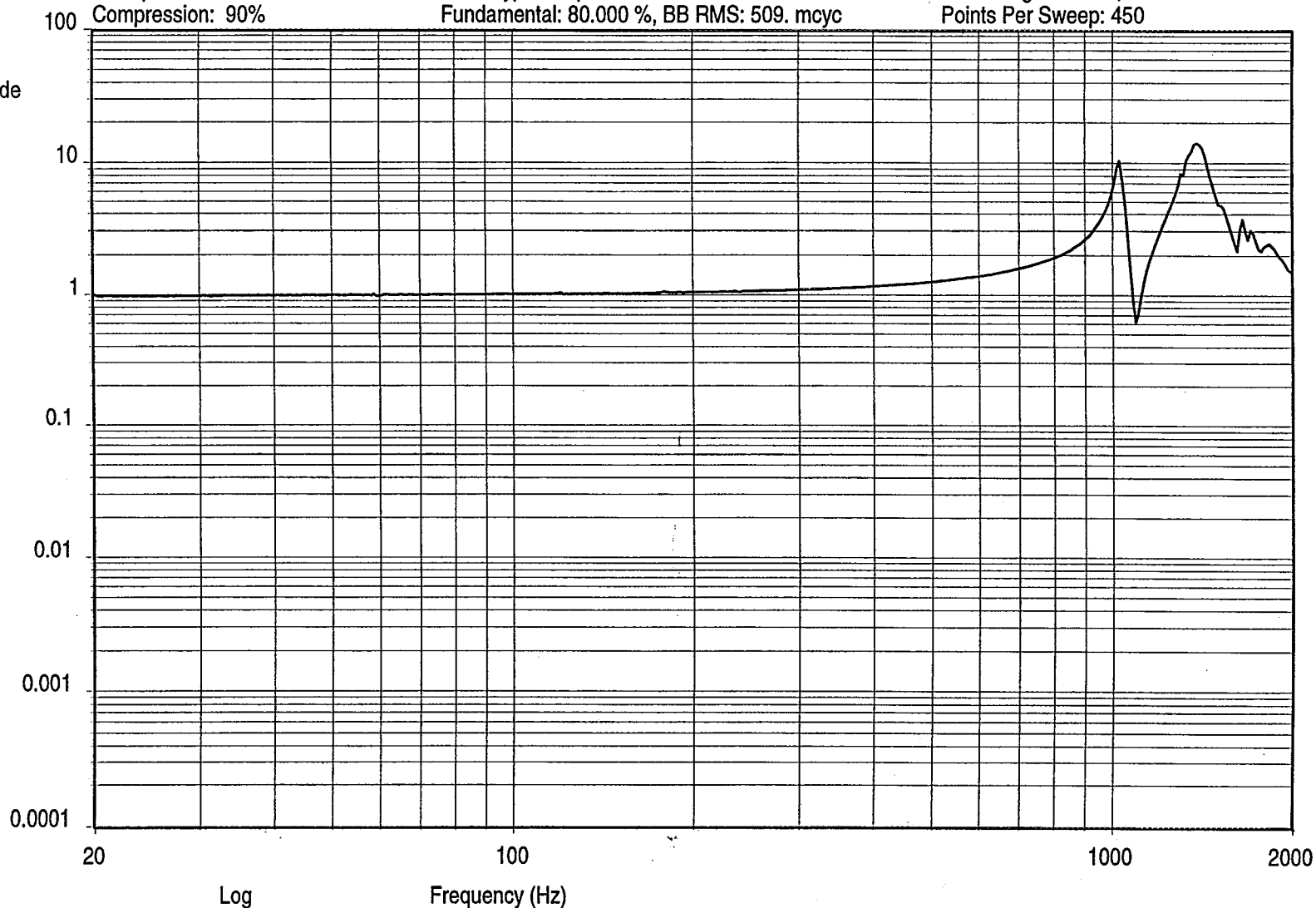
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

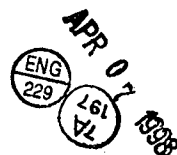
H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



13:31:05
07-Apr-1998

AMSU PLO S/O 431615,P/N 1348360-1
POST Y SINE SWEEP S/N F03 METSAT
Sine Test Name: AMSU_A2.tmp



4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 13:23:36

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
Reference CSL Threshold: 20.00 dB
CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
Frequency: 100.00 Hz
Maximum Drive: 100.00 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Null	DC Acceler	g	0.00		Fundamental
2	Auxiliary	No	10.00	Null	DC Acceler	g			Fundamental
3	Auxiliary	No	10.00	Null	DC Acceler	g			Fundamental
4	Auxiliary	No	10.00	Null	DC Acceler	g			Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation
1	Control	Yes	100.00	CONTROL
2	Auxiliary	No	10.00	X AXIS
3	Auxiliary	No	10.00	Z AXIS
4	Auxiliary	No	10.00	Y AXIS

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/CONTROL

DOCUMENTATION:

Display Text -
Title 1: AMSU PLO S/O 431615,P/N 1348360-1
Title 2: POST Y SINE SWEEP S/N F03 METSAT
List Only Text -
Title 3:
Prompt before Test: Yes
Data Storage -
Storage Mode: Off
Message Log -
Log Mode: Off
Printing -
Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

Section 2B: Vibration - F04

Following is the data taken after acceptance level vibration testing for PLO SN F04.

Test	Expected Value	Post X axis	Post Y axis	Post Z axis
Output Frequency	57.290344 GHz \pm 200 kHz	57.290335 GHz	57.290336 GHz	57.290336 GHz
Output Power	18.5 dBm \pm 1.5 dB	19.91	19.93	19.95

Both the frequency span of 100 Hz and the power difference of 0.04 dB are considered to be changes not brought about by vibration stresses, but rather from experimental error.

The following pages contain the raw data further describing the test and the results for the tests on PLO F04.

TEST DATA SHEET 8A
 Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: 5461 Post
 Signature Pre-environmental LPT at Room Temperature
Pre-vibration

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	Not used N/A*
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.005 VAC Pass
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.004 VAC Pass

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	+15.0 V	Pass
	Voltage Meter 2	-15 ± 0.1 V	-15.0 V	Pass
	Current Meter 1	600 mA max.	529 mA	Pass
	Current Meter 2	100 mA max. 0002 GHz	57 mA	Pass
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290 335 35 GHz	Pass
10	Output Power	18.5 dBm ± 1.5 dB	19.5 dBm	Pass

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

Shop Order No.: 431618
 operation.: 0132
 Unit Serial No.: F84
 Date: 4.3.98

Test Engineer: Mark C. Lyle
 Quality Assurance: Central R. Smith (74 190) APR 3 98
 Govt Rep: D. J. Jones 4-3-98
 DCMC:

TEST DATA SHEET 8
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Haig
Signature

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	.03V
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	.02V

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.99 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.03 V	P
	Current Meter 1	600 mA max.	522 mA	P
	Current Meter 2	100 mA max.	57.55 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290335 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.91 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"X" AXIS

Shop Order No.: 431615

Unit Serial No.: F04

Date: 4/7/98

Test Engineer: R. Haig

Quality Assurance: (7A) 268 APR 7 '98

DCMC: (7A) 268 APR 7 '98

TEST DATA SHEET 8
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Haig
Signature

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	P
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	P

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.98 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.03 V	P
	Current Meter 1	600 mA max.	526 mA	P
	Current Meter 2	100 mA max.	57.38 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290336 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.93 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"Y" AXIS

Shop Order No.: 431618
Unit Serial No.: F04
Date: 4/2/98

Test Engineer: R. Haig
Quality Assurance: APR 07 1998
DCMC: APR 07 1998

TEST DATA SHEET 8
Limited Functional Test (Paragraph 4.2.3)

Test Setup Verified: R. Hail
Signature

Paragraph 4.2.3.2:

Step	Test	Required	Measurement	Pass/Fail
3	Potential Difference			
	From	To		
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	P
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	P

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	14.99 V	P
	Voltage Meter 2	-15 ± 0.1 V	-15.03 V	P
	Current Meter 1	600 mA max.	526 mA	P
	Current Meter 2	100 mA max.	57.36 mA	P
9	Output Frequency	57.290344 GHz ± 100 kHz	57.290336 GHz	P
10	Output Power	18.5 dBm ± 1.5 dB	19.8 dBm	P

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

"2" AXIS

Shop Order No.: 431618

Unit Serial No.: F04

Date: 4/7/98

Test Engineer: R. Hail

Quality Assurance: (261 72) APR 07 1998

DCMC: (100) APR 07 1998

TO: D. R. Pines
FROM: R. J. Heffner
SUBJECT: AMSU-A Phase Lock Oscillator (PLO) Acceptance Vibration Testing of P/N 1348360-1, S/N's F03 and F04
COPIES TO: D. F. Brown, R. V. Hauerwaas, L.T. Paliwoda, P. K. Patel, S. W. Reynolds, D.L. Tran, Writer, File

DATE: 08 - Apr -1998
plovibtest3#279.doc
170:8611:98#279

REFERENCES:

1. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator Qualification/Acceptance Vibration Testing Procedure", Rev. 3, OC-426, March 1998.
2. "PLO Assembly", Dwg. 1348360.
3. "Receiver Assembly A1-1", Dwg. 1356429.
4. "Shelf Assy, RF, Lower", Dwg. 1331555.
5. "AMSU-A Phase Lock Oscillator (PLO) Acceptance Vibration Testing of P/N 1348360-1, S/N F02", IOM 170:8611:#1291, 9 Dec. 1997.
6. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator, P/N 1348360-1, S/N F03, Mfg. S/O 431615.
7. "Environmental Requirements AMSU-A Instrument Components", AE-26578B, 16 March 1995.
8. "Advanced Microwave Sounding Unit (AMSU-A) Phase Lock Oscillator, P/N 1348360-1, S/N F04, Mfg. S/O 431618.

PURPOSE

The purpose of this memo is to present a summary of the acceptance level vibration testing performed on the AMSU-A P/N 1348360-1 S/N's F03 and F04 PLO's on April 7, 1998.

SUMMARY

The AMSU-A P/N 1348360-1 S/N's F03 and F04 PLOs were successfully tested to acceptance level component random vibration loads per the Ref. 1 procedure. Test level was at 13.6 Grms. Before and after each axis of random vibration, low level sine sweeps were run to verify structural integrity of the component assembly. In addition, an electrical functional test

was performed, successfully, after each random vibration test axis. Maximum response of the single triaxial response accelerometer mounted on the PLL/TCXO Assembly occurred for (1) S/N F03 at the METSAT Y-Axis test, with Y-Axis response of 47.303 Grms, and (2) . Maximum peak 3σ load, for the METSAT Y-Axis test at 1st f_n of approximately 1026 Hz is estimated at 56.9 g.

RESULTS

The Ref. 2 S/N F03 instrument was mounted per Ref. 1, Figure 5, "Test Fixture Axis Orientation". Using METSAT orientation, the X-Axis was tested first, with a 0.25 g 20-2000 Hz pre-random sine sweep, the 13.6 Grms random, and a 0.25 g 20-2000 Hz post-random sine sweep all run, followed by an electrical functional test. Subsequently, Z-Axis and Y-Axis test sequences were also run. The same sequence of tests was run for Ref. 2 S/N f04. In all instances the pre-random and post-random sine sweeps showed no changes in the frequency responses before and after the random tests. Of greater significance, each electrical function test, run after each test axis vibration sequence, was successful.

Table 1 summarizes the responses recorded per the control accelerometer and the triaxial response accelerometer for S/N F03. Listed are total Grms responses along with an estimate of the peak 3σ response at 1st resonance, determined per half-power point method. Table 2 summarizes the same information for S/N F04.

The results of Table 1 compare to the Ref. 5, Table 1 values. However, there are some differences, which are probably due to (1) different units, and (2) different locations of the response accelerometers (see Ref. 1 and 5). For S/N F01, the response accelerometer was mounted on the +Sun side of the upper PLO assembly (on the PLL assembly). For S/N F02, the response accelerometer was moved to the +Velocity side of the upper PLO (PLL) assembly. The difference in stiffness of the mounts may have contributed to the response differences.

Note that this test continued using #6 mounting screws attaching the unit to the fixture adapter plate (see Ref. 5 discussion).

Table 1 Analysis of S/N F03 Random Vibration Data

X-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.590					
X-Response	18.456	864	903	0.51	4.46	13.4
Y-Response	10.292	886	931	1.0	6.71	20.1
Z-Response	9.652	886	920	0.21	2.67	8.0

Z-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.533					
X-Response	13.898	1055	1079	1.75	6.48	19.4
Y-Response	7.147	1056	1088	0.72	4.8	14.4
Z-Response	30.320	1035	1068	2.1	8.32	25.0

Y-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.521					
X-Response	21.303	1027	1054	4.0	10.39	31.2
Y-Response	44.408	1022	1054	6.0	13.86	41.6
Z-Response	10.896	1022	1054	0.49	3.96	11.9

Table 2 Analysis of S/N F04 Random Vibration Data

X-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.513					
X-Response	21.552	875	894	0.60	3.38	10.1
Y-Response	11.190	881	914	2.0	8.12	24.4
Z-Response	16.889	891	914	0.11	1.59	4.8

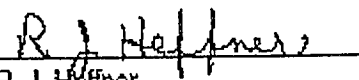
Z-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Te
Control	13.552					
X-Response	15.001	1038	1064	1.7	6.65	19.9
Y-Response	7.591	1041	1064	1.15	5.14	15.4
Z-Response	31.371	1035	1068	2.05	8.22	24.7

Y-Axis Test						
Accel. No.	Total Response Grms	1st fn f(low) Hz	1st fn f(high) Hz	1st Peak Resonance g2/Hz	1st Total Resonance Grms	Estimated Peak g's During Test
Control	13.522					
X-Response	21.257	1003	1041	5.2	14.06	42.2
Y-Response	47.303	1011	1041	12	18.97	56.9
Z-Response	6.285	1041	1101	0.13	2.79	8.4

Figures 1-3 are S/N F03 plots of the in-axis responses for random vibration for the PLO for each of the three test axes. A complete set of vibration data, including all sine sweep data, is included with the Ref. 6 shop order. Figures 4-6 are S/N F04 plots of the in-axis responses for random vibration for the PLO for each of the three test axes. A complete set of vibration data, including all sine sweep data, is included with the Ref. 8 shop order.

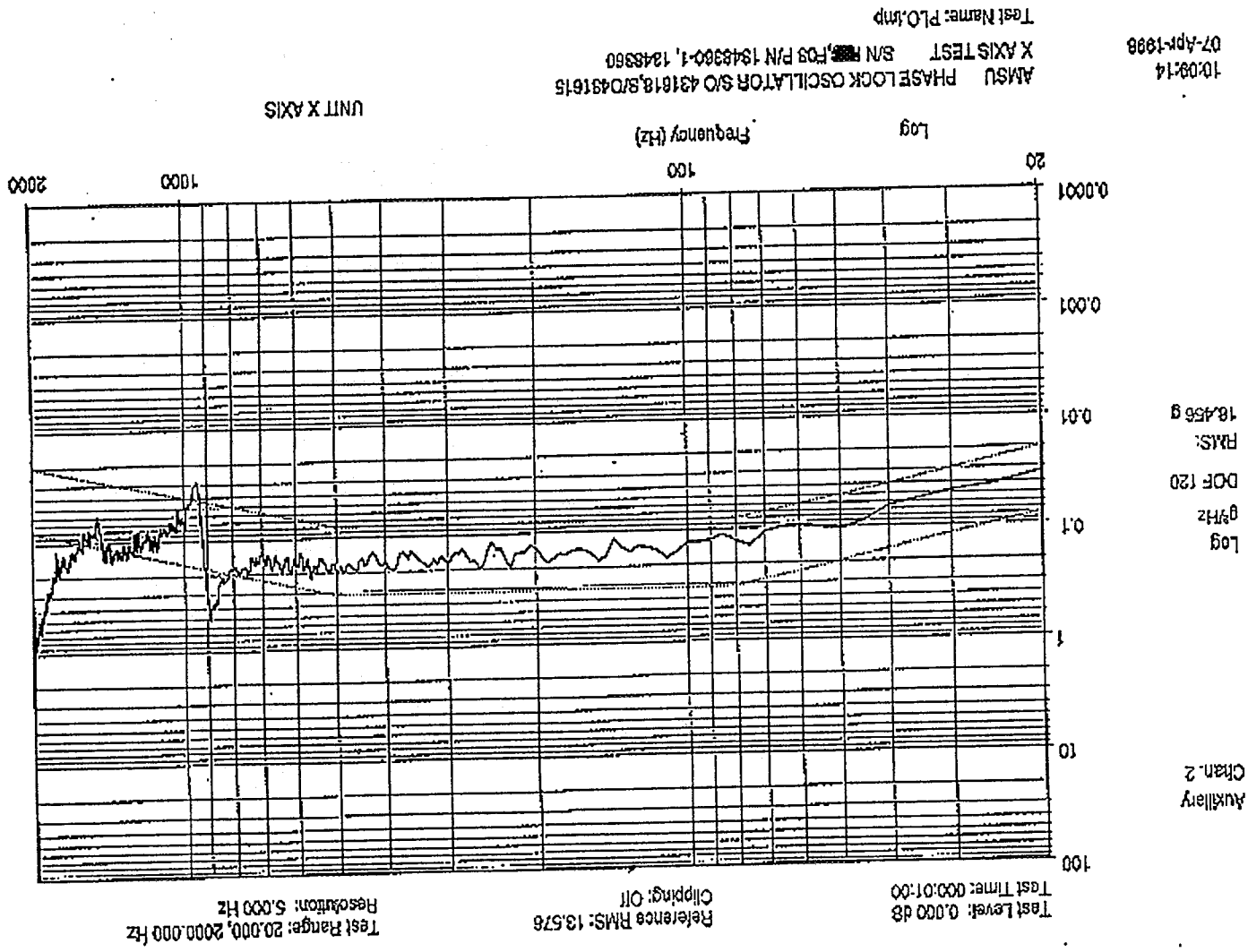
CONCLUSIONS and RECOMMENDATIONS

It is concluded that the S/N F03 and S/N F04 P/N 1348360-1 PLO's successfully passed the Ref. 7 AMSU-A Instrument Component Random Vibration Tests.


R. J. Heffner
Mechanical Design and Analysis

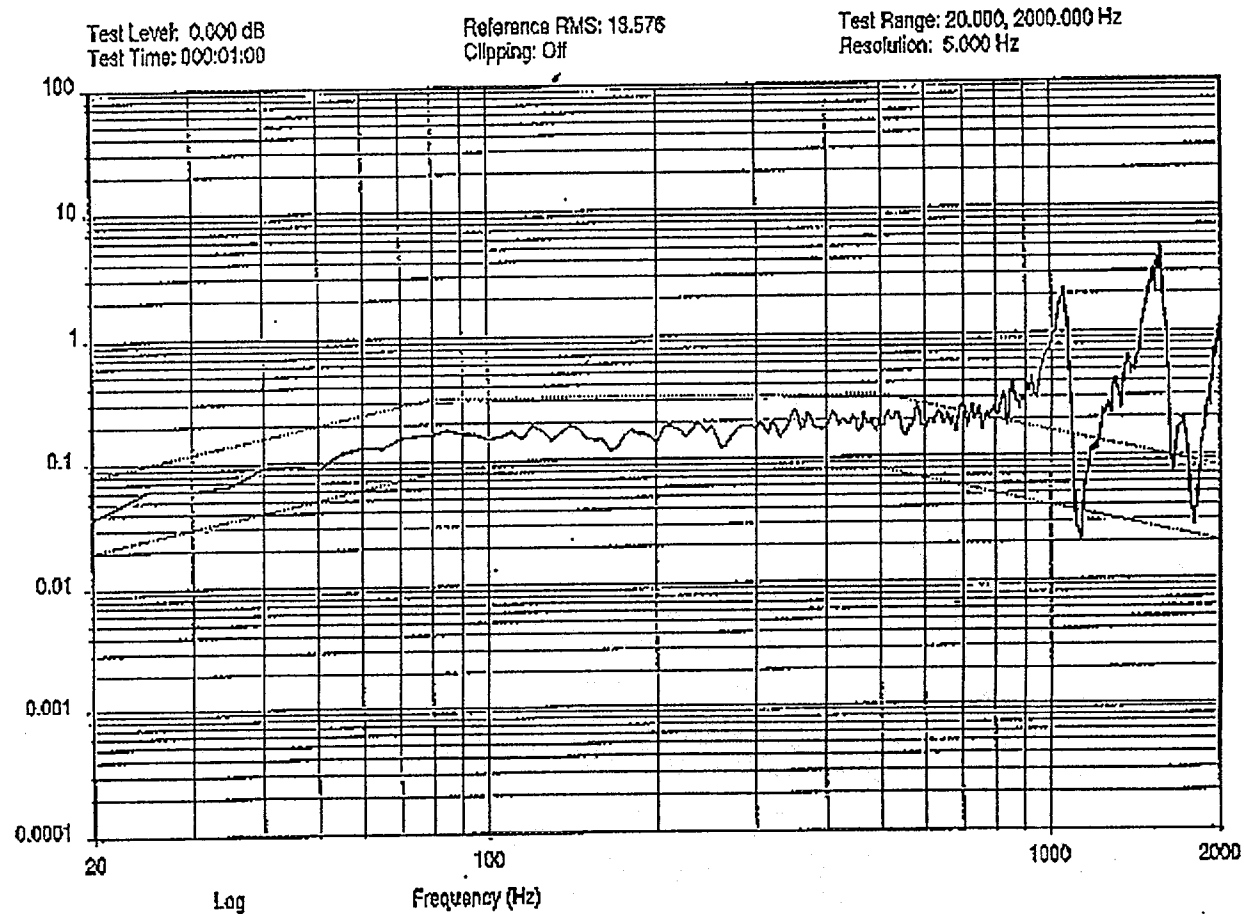
FILES: PC My Documents/amsua2/plovibtest3#274.doc

Figure 1



Auxiliary
Chan. 9

Log
g²/Hz
DOF 120
RMS:
30.320 g



11:27:36
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O431615
Z AXIS TEST S/N ~~XXXX~~, F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.Imp

Figure 2

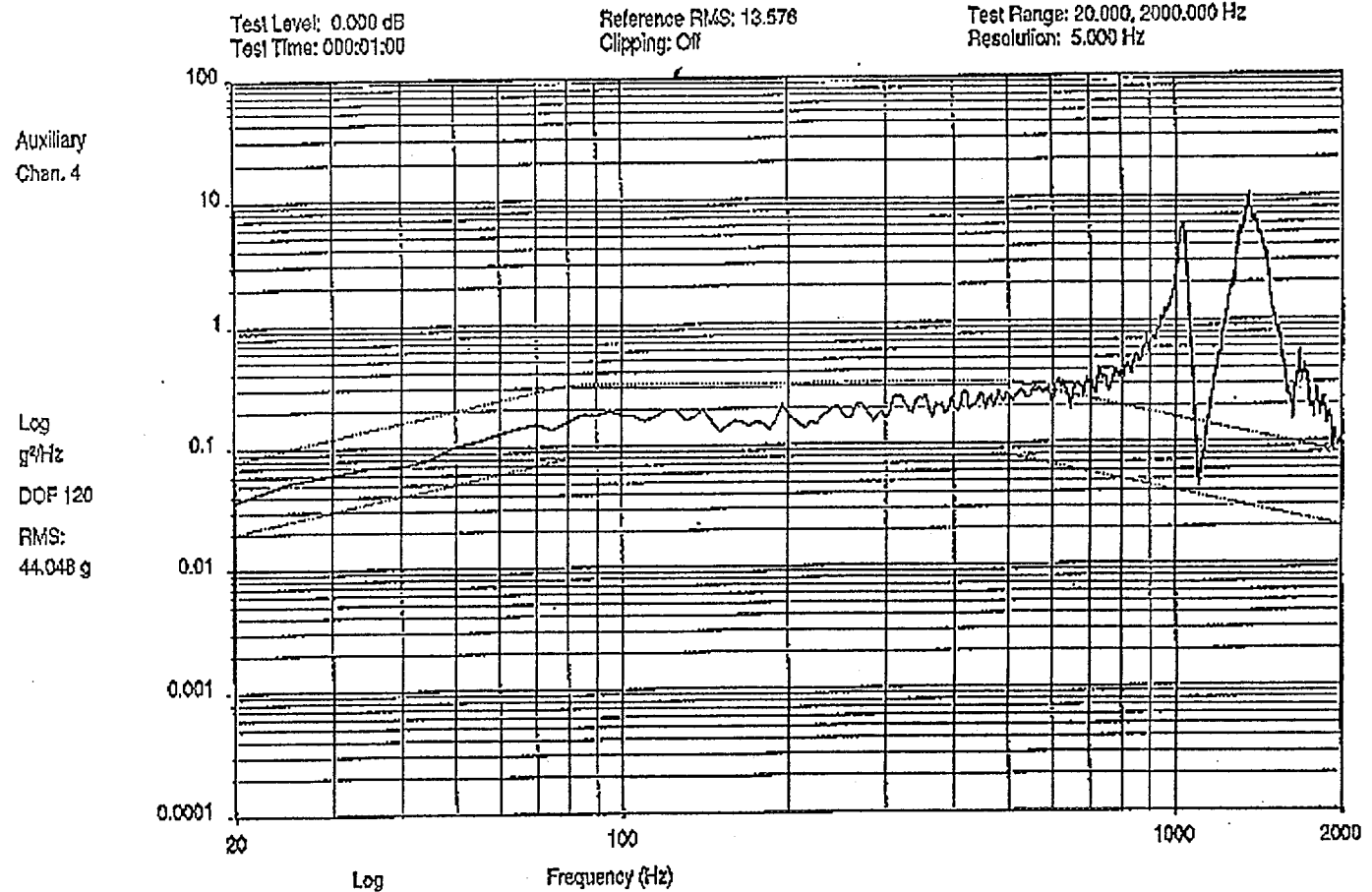


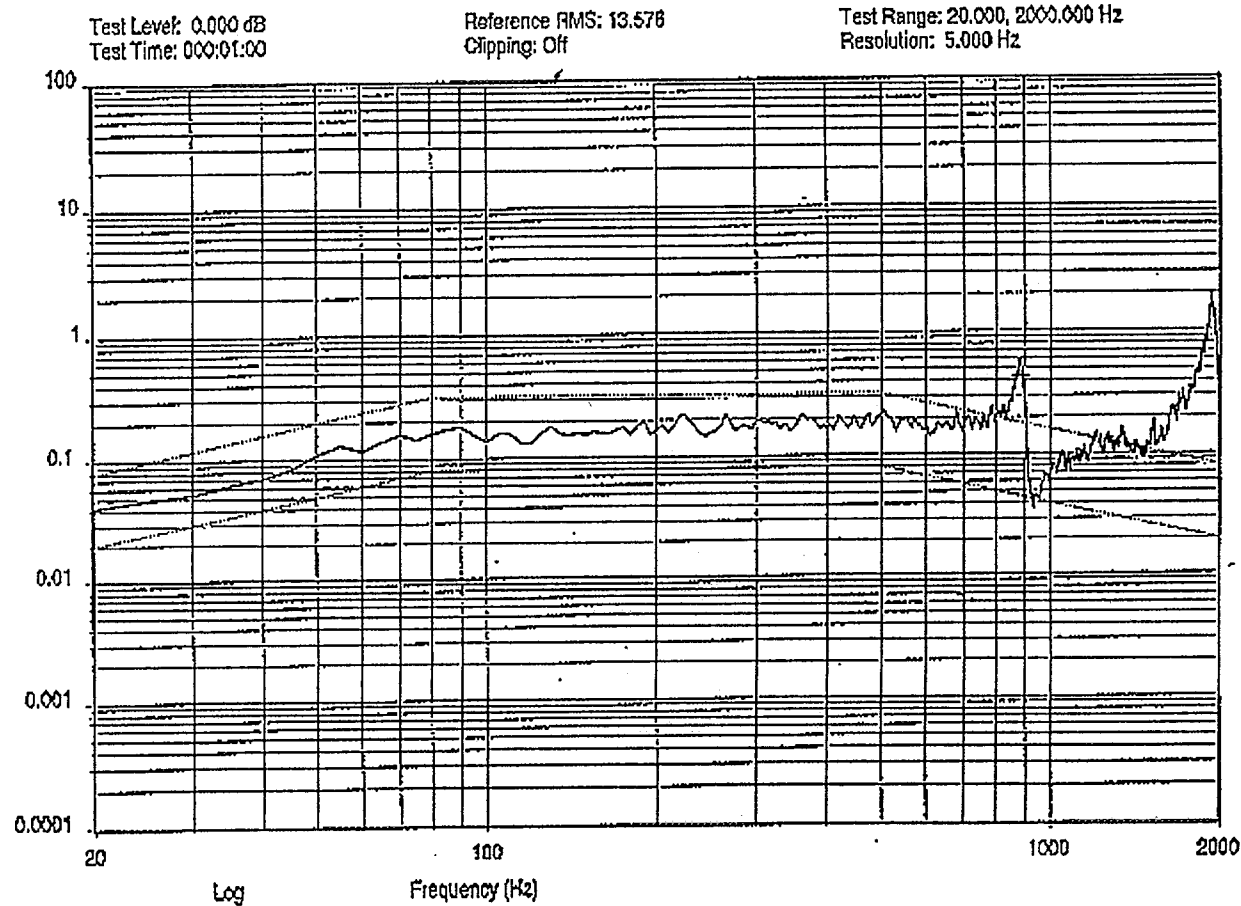
Figure 3

13:18:37
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618,S/O 431615
Y AXIS TEST S/N [REDACTED], F03 P/N 1348360-1, 1348360 METSAT
Test Name: PLO.imp

Auxiliary
Chan. 8

Log
g/Hz
DOP 120
RMS:
21.552 g



14:51:02
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/D 431618
X AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.imp

Figure 4

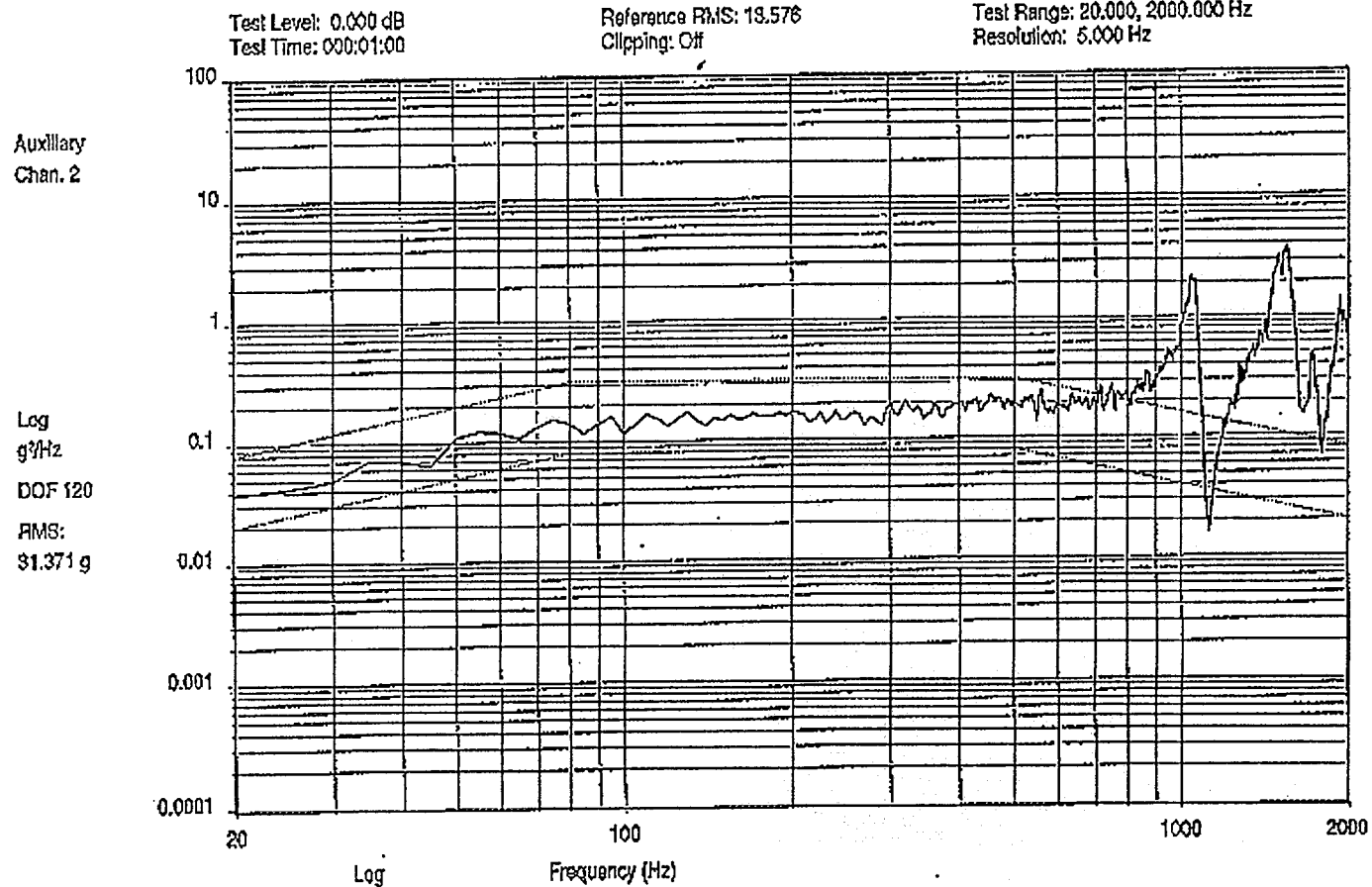


Figure 5

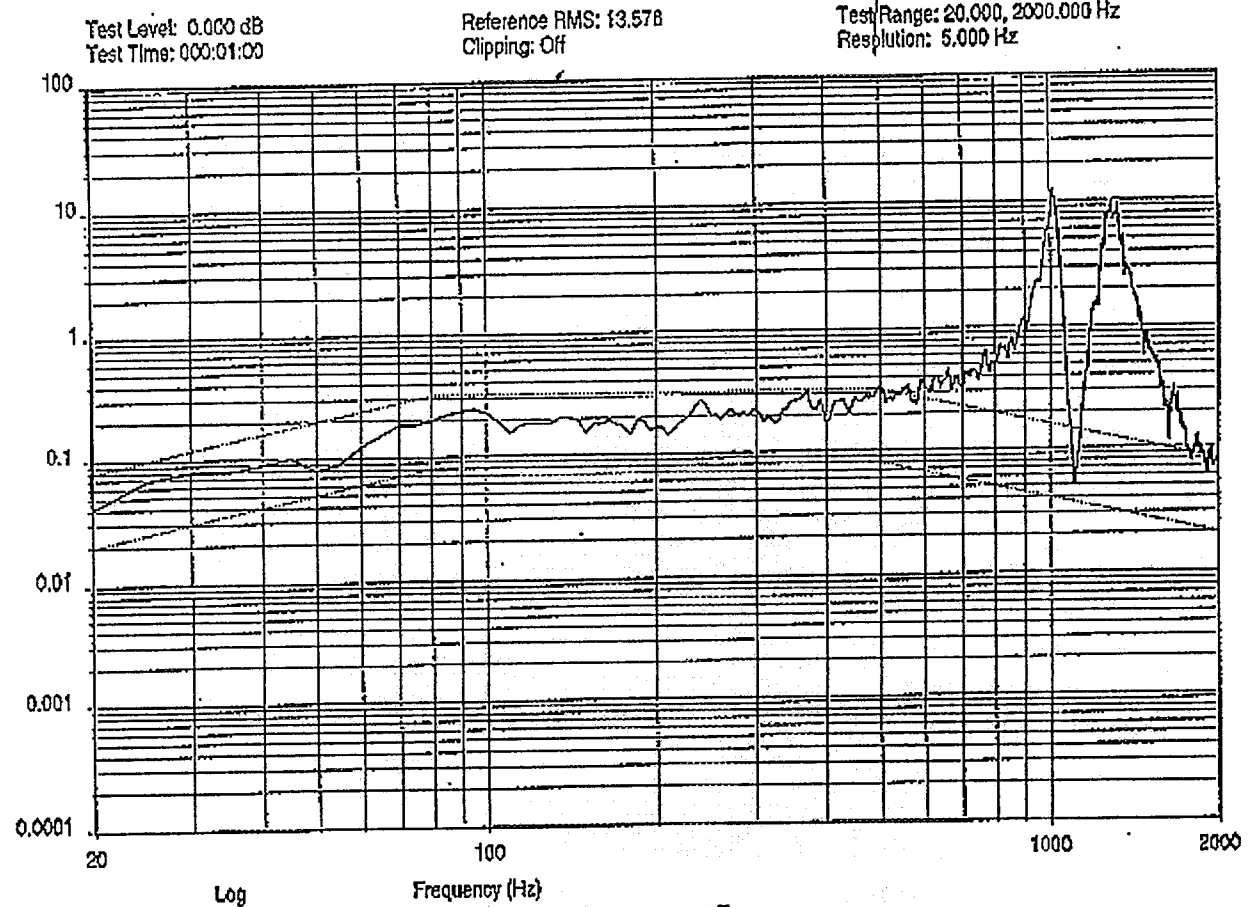
15:44:15
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Z AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

UNIT Z AXIS

Auxiliary
Chan. 4

Log
g²/Hz
DOF 120
RMS:
47.308 g



16:23:56
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1348380-1 METSAT
Test Name: PLO.Imp

UNIT Y AXIS

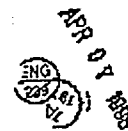


Figure 6

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

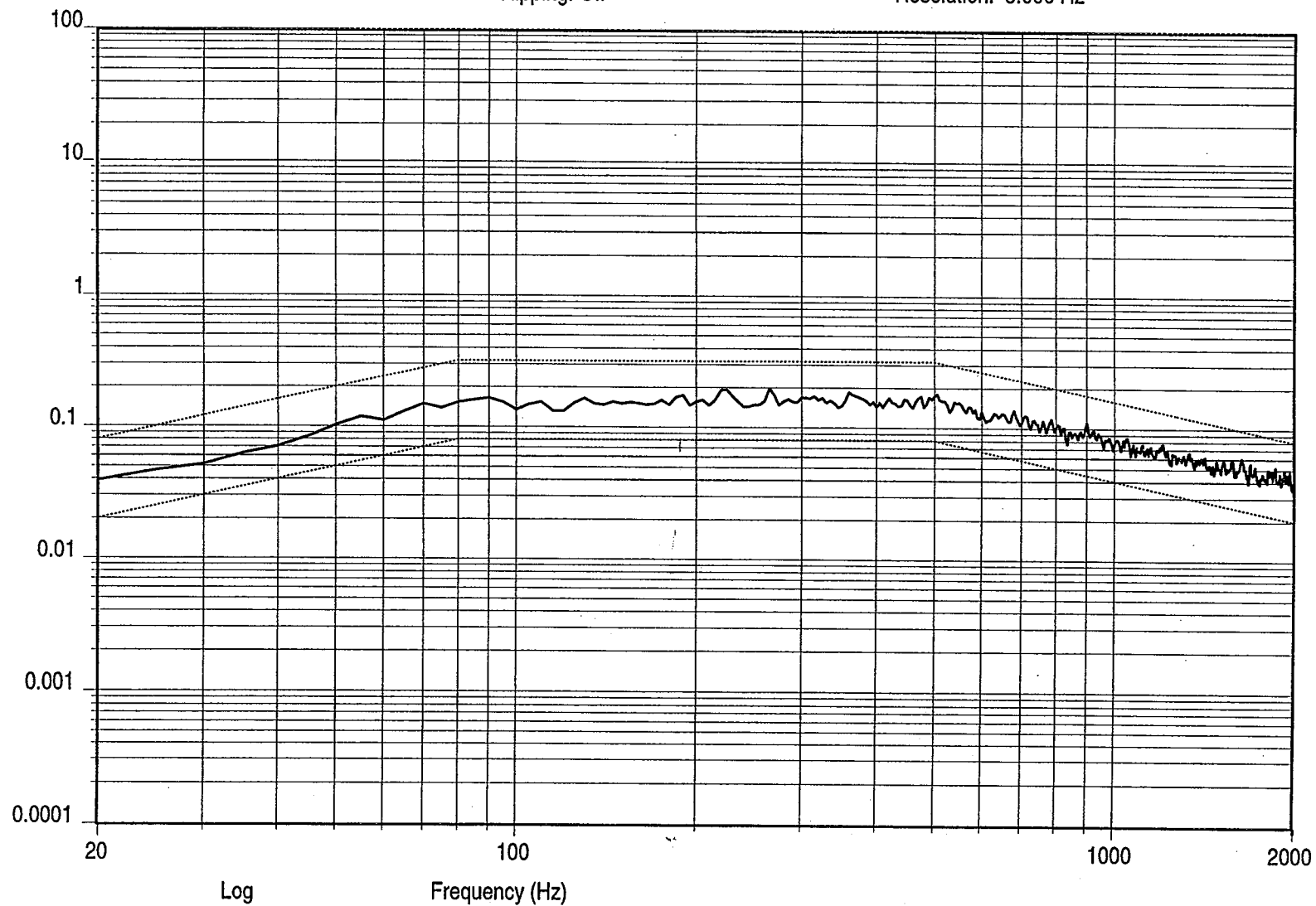
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

Log
 g^2/Hz

DOF 200

RMS:
13.513 g



14:50:51
Tue Apr 07 1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
X AXIS SYSTEM CHECKOUT S/N F04, P/N 1348360-1 METSAT
Data Review Name: PLO.tmp

ENG
229

APR 07 1998

892
4-7-98

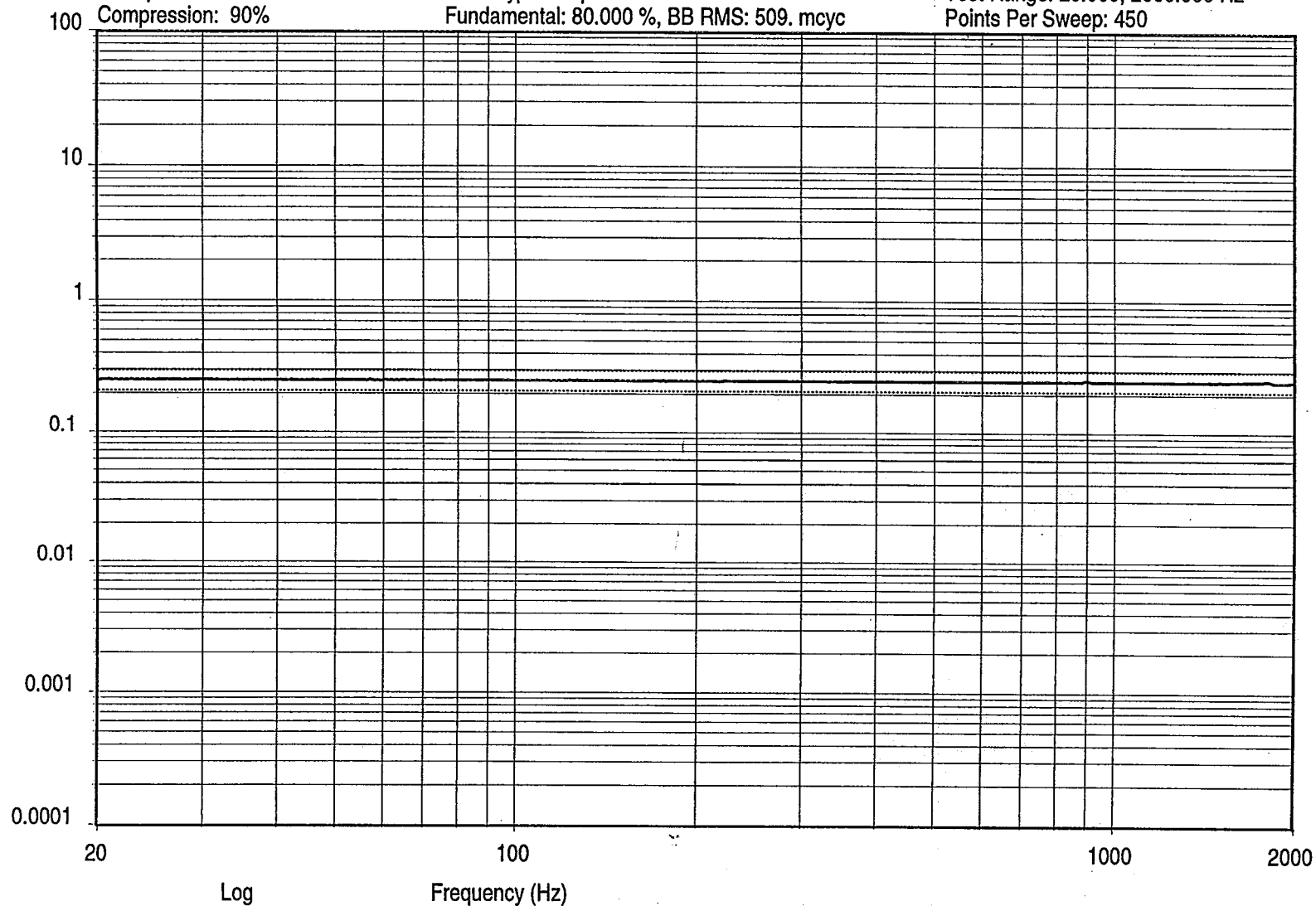
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



14:36:58
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

10

1

Log
Acceleration
g (0-pk)

0.1

0.01

0.001

0.0001

20

100

1000

2000

Log

Frequency (Hz)

14:37:06
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

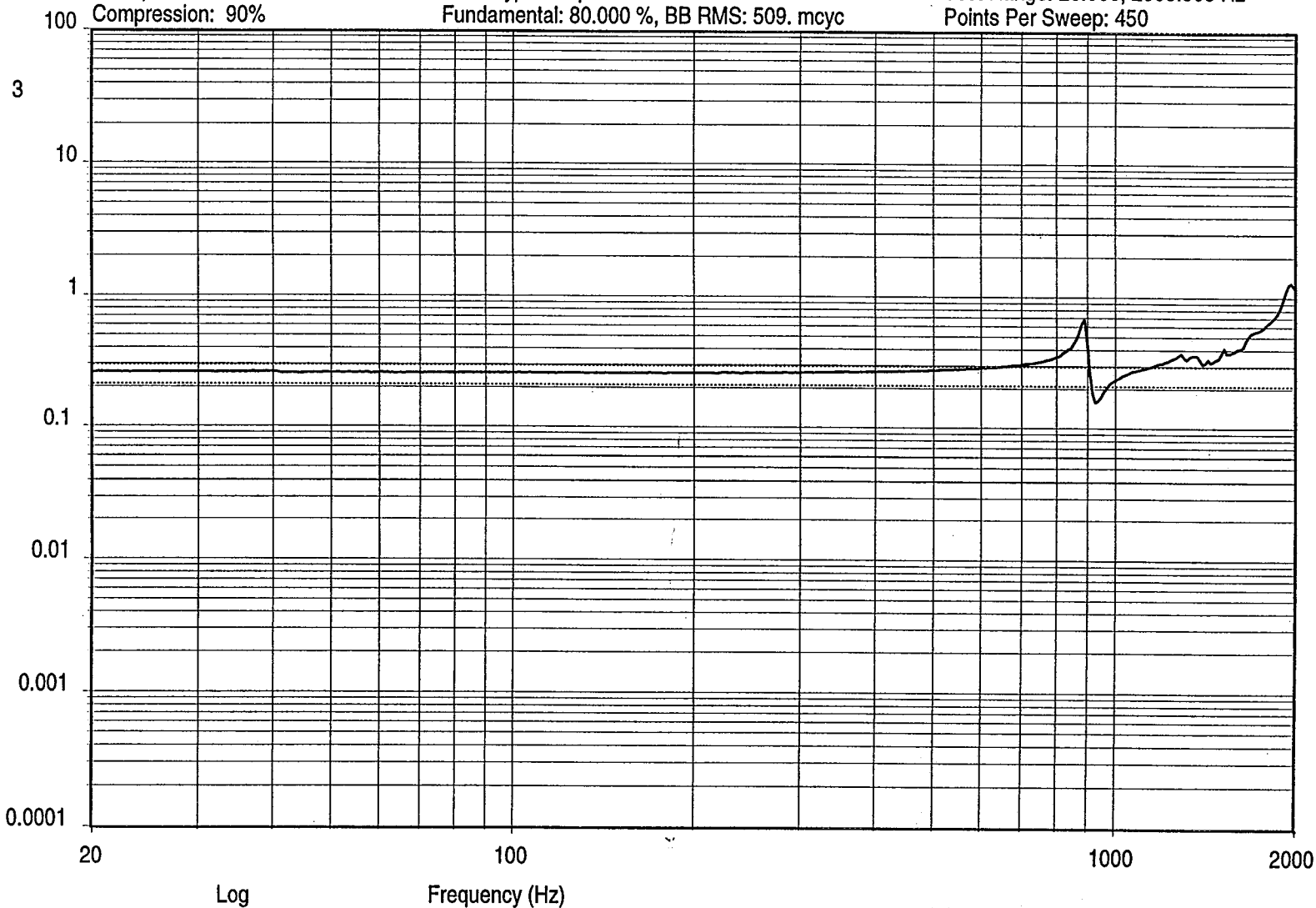
Z AXIS

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental



14:37:01
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

X AXIS

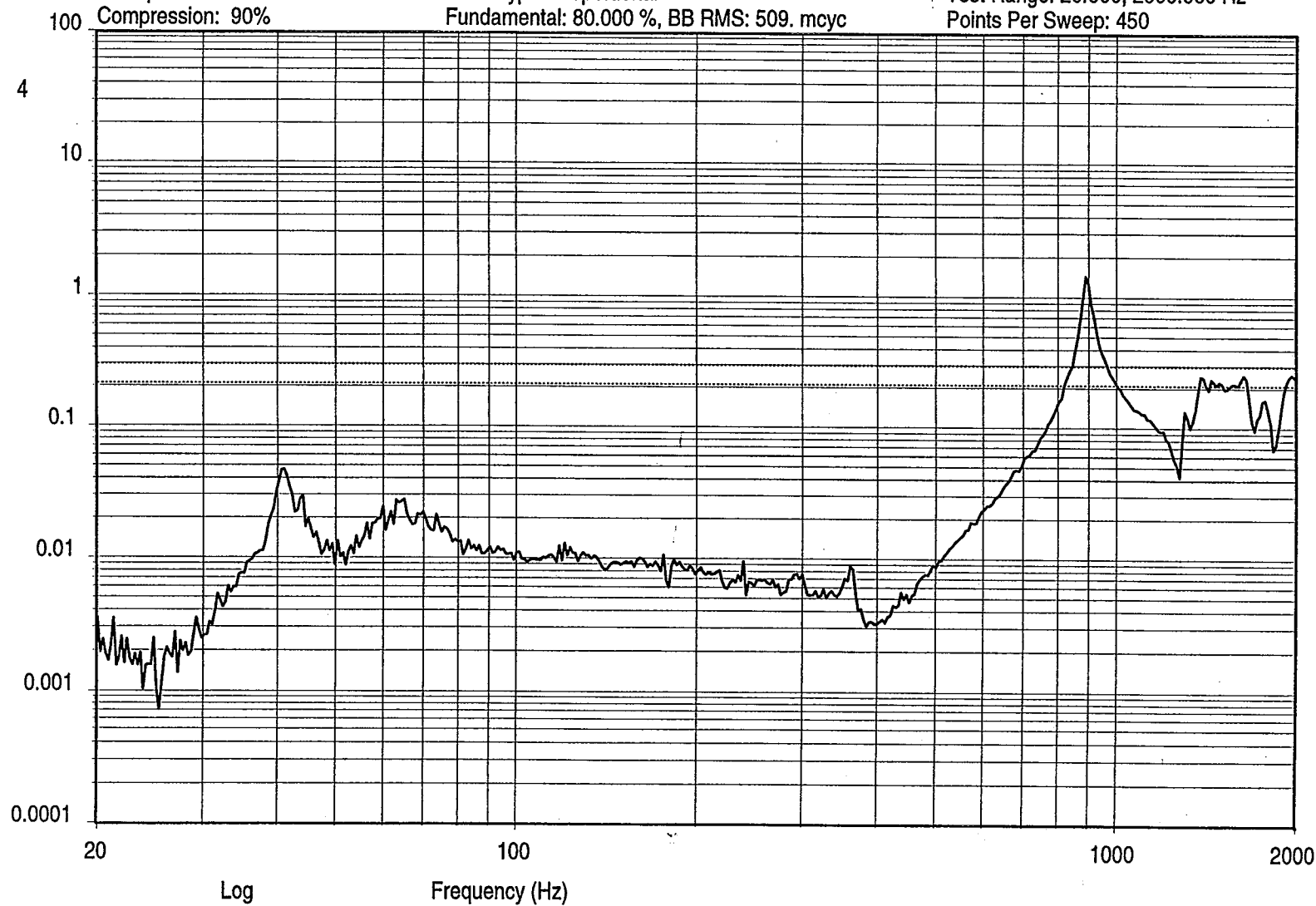
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

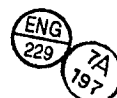
Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



14:37:10
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

Y AXIS

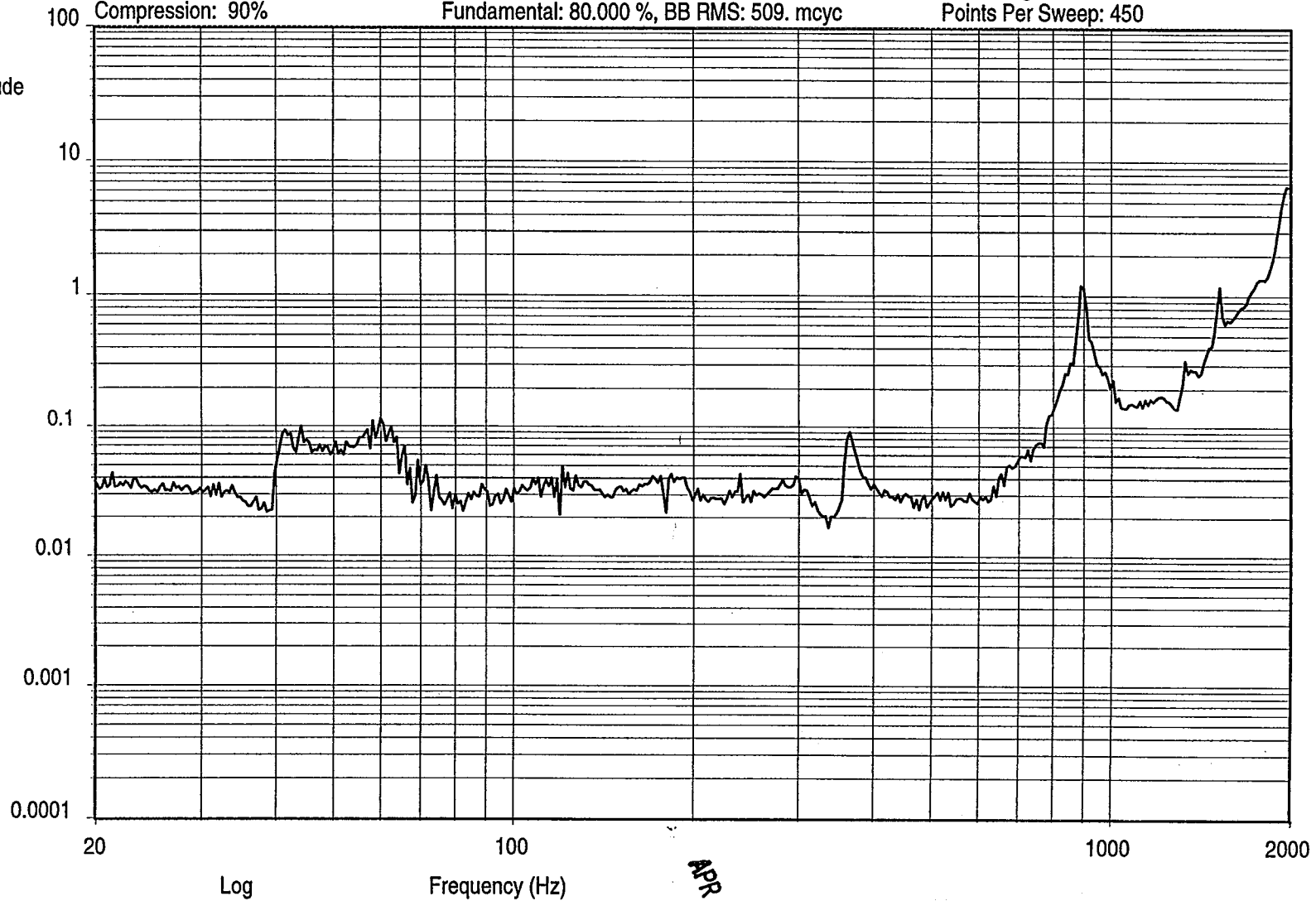
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

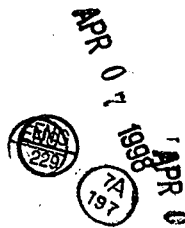
Log
Ratio



14:37:49
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

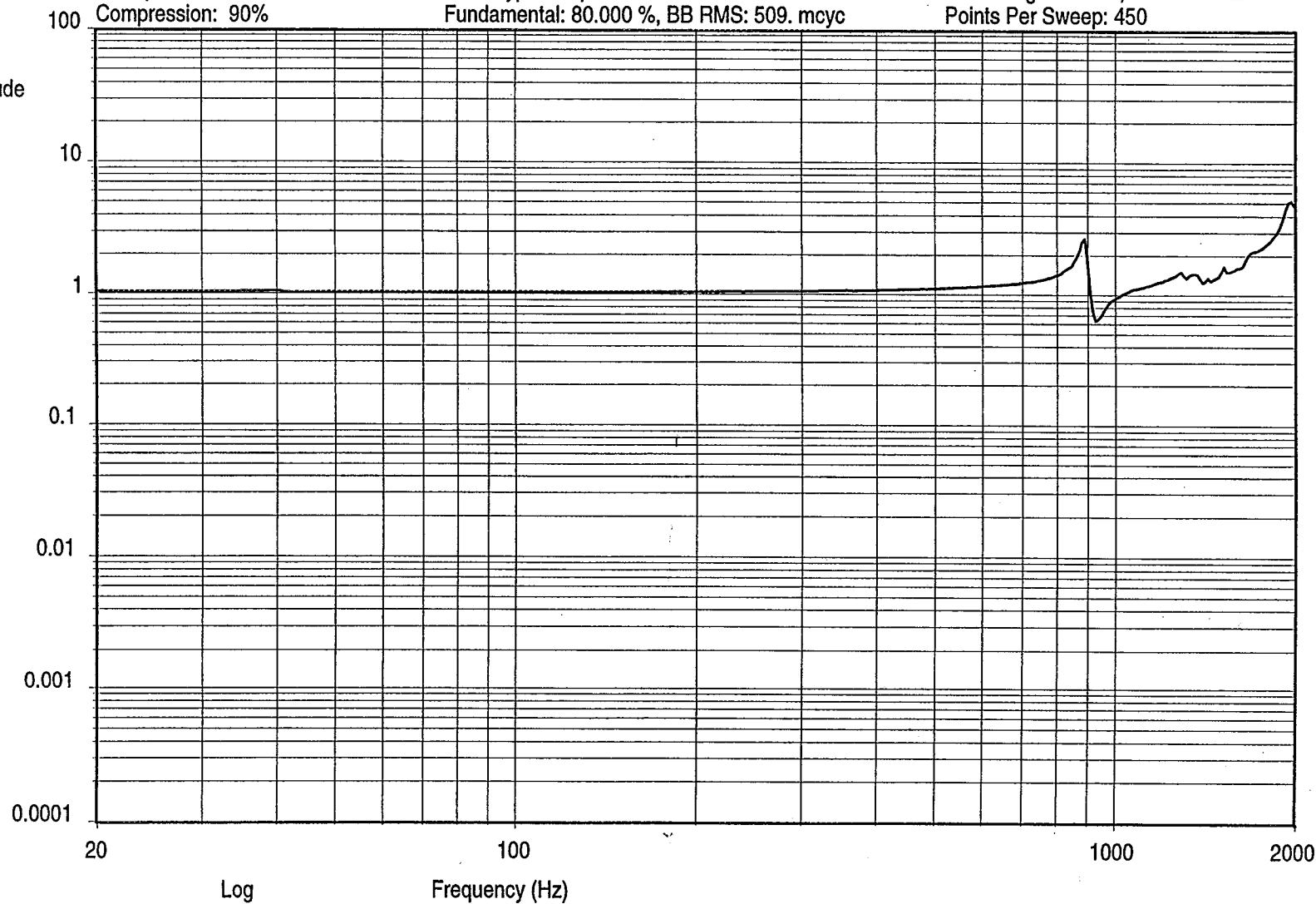
Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 /Ch 1

Log

Ratio



14:37:53
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL

ENG
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APR 07 1998

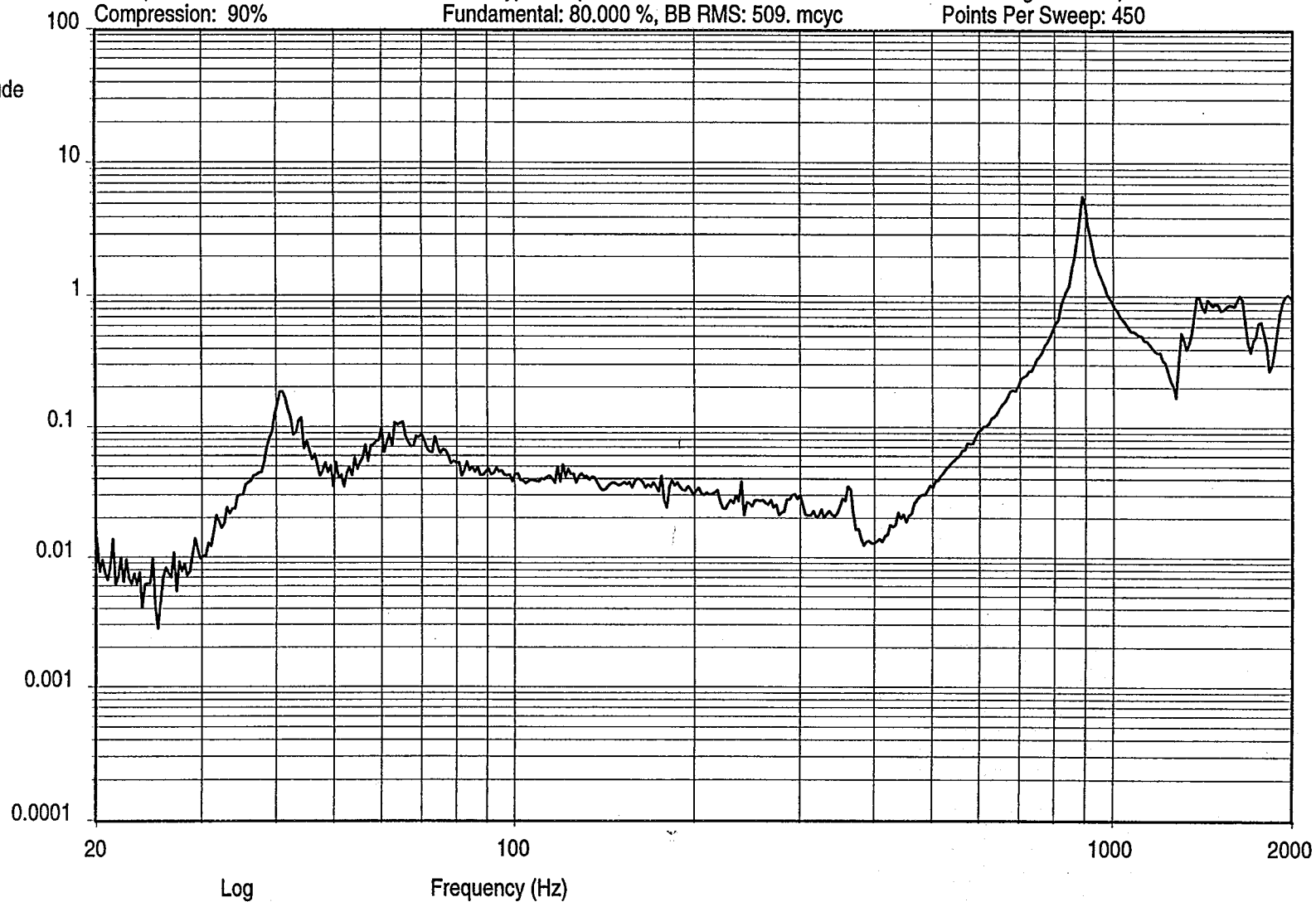
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



14:37:57
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

4/ CONTROL

ENG
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APR 07 1998

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 14:28:23

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1
1	Control	Yes	100.00	CONTROL
2	Auxiliary	No	10.00	Z AXIS
3	Auxiliary	No	10.00	X AXIS
4	Auxiliary	No	10.00	Y AXIS

Label 2

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -

Title 1: AMSU PLO S/O 431618,P/N 1348360-1
 Title 2: PRE X SINE SWEEP S/N F04

METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Storage Mode: Off

Message Log -

Log Mode: Off

Printing -

Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

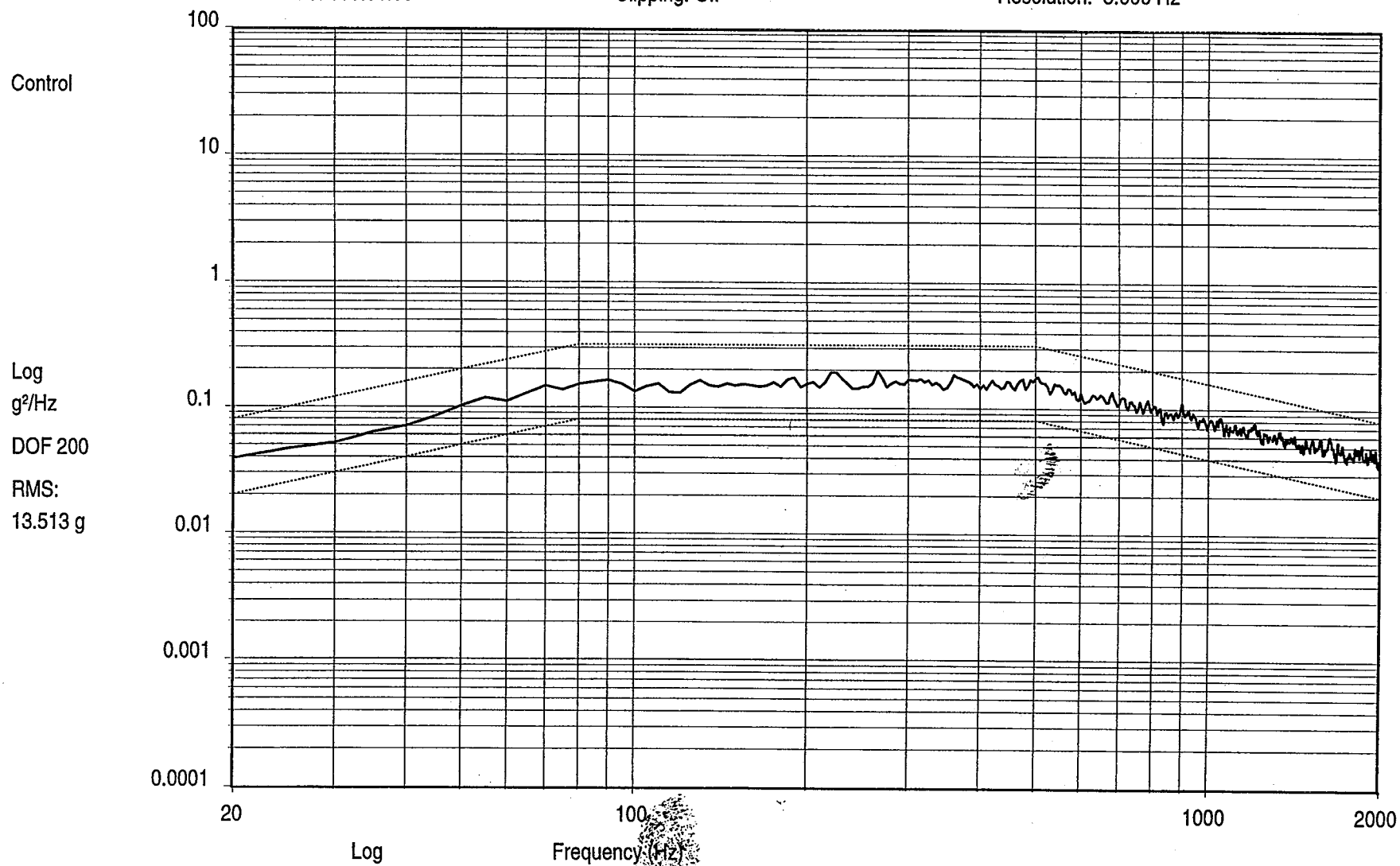
Enable Shaker Limits: No

End of Sine Test List

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz



14:51:00
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
X AXIS TEST S/N F04, P/N 1348360-1 - METSAT
Test Name: PLO.tmp

ENG
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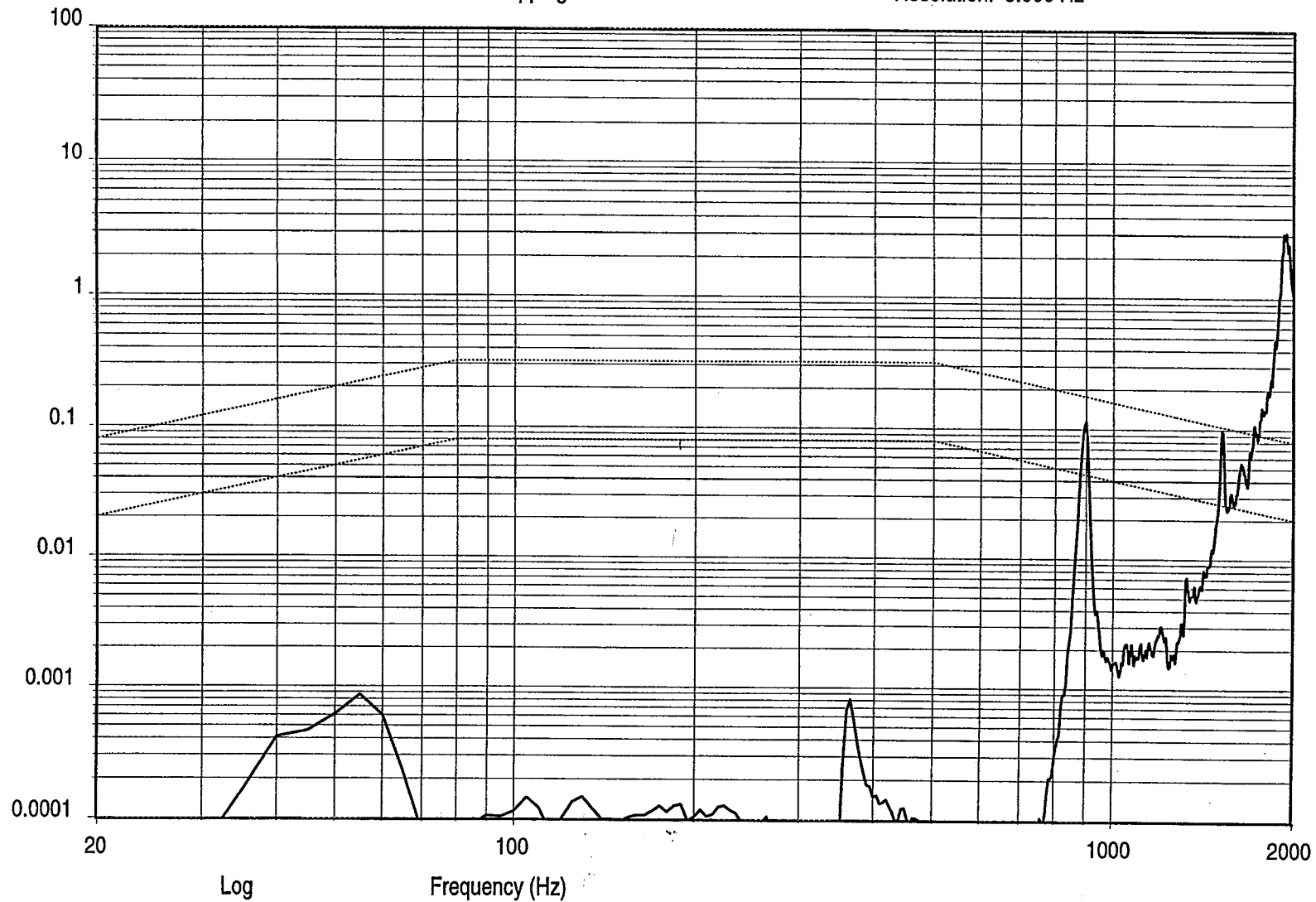
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 2

Log
 g^2/Hz
DOF 120
RMS:
16.889 g



14:51:10
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
X AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp



APR 07 1998

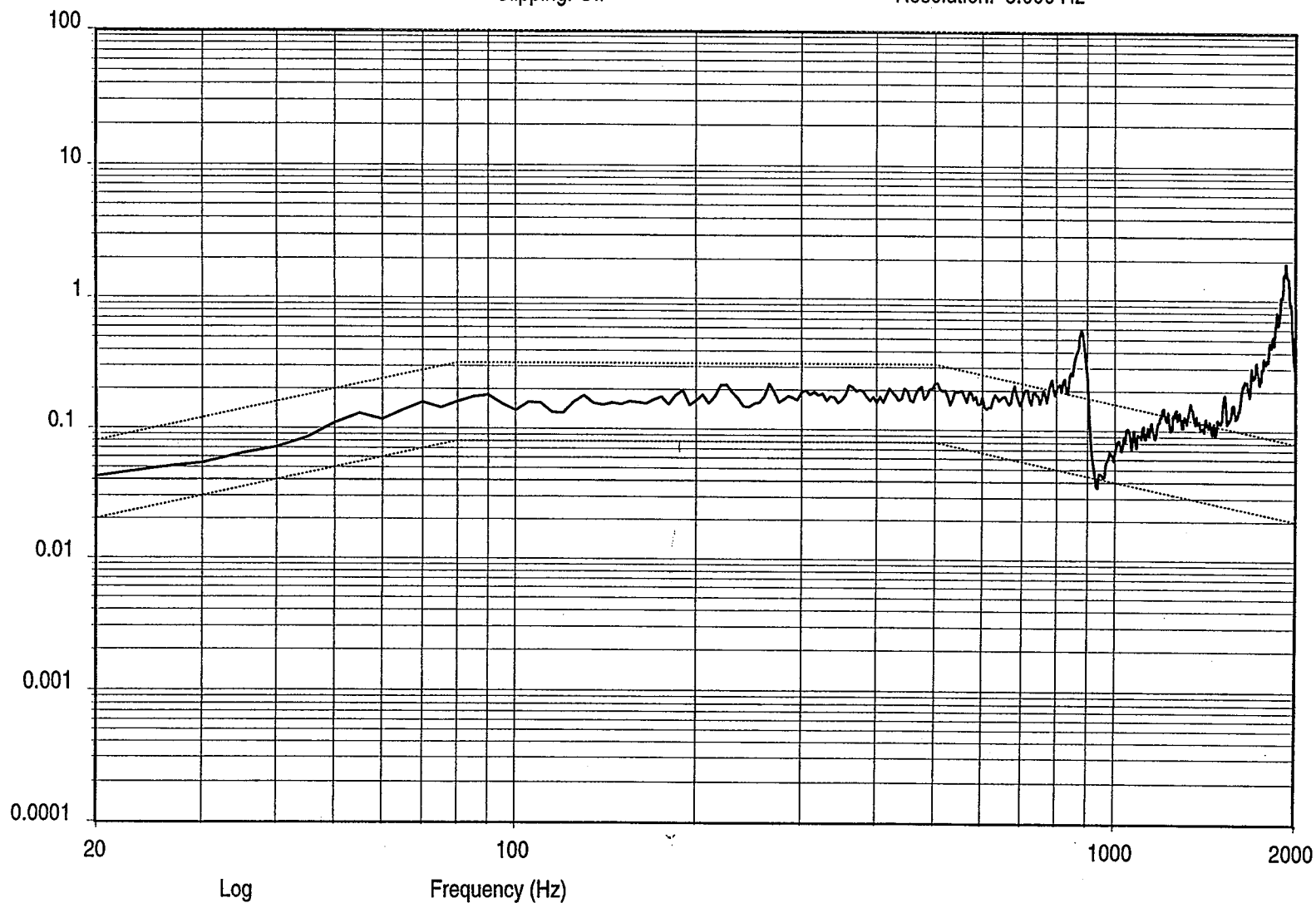
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 3

Log
 g^2/Hz
DOF 120
RMS:
21.552 g



14:51:02
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
X AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp



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Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

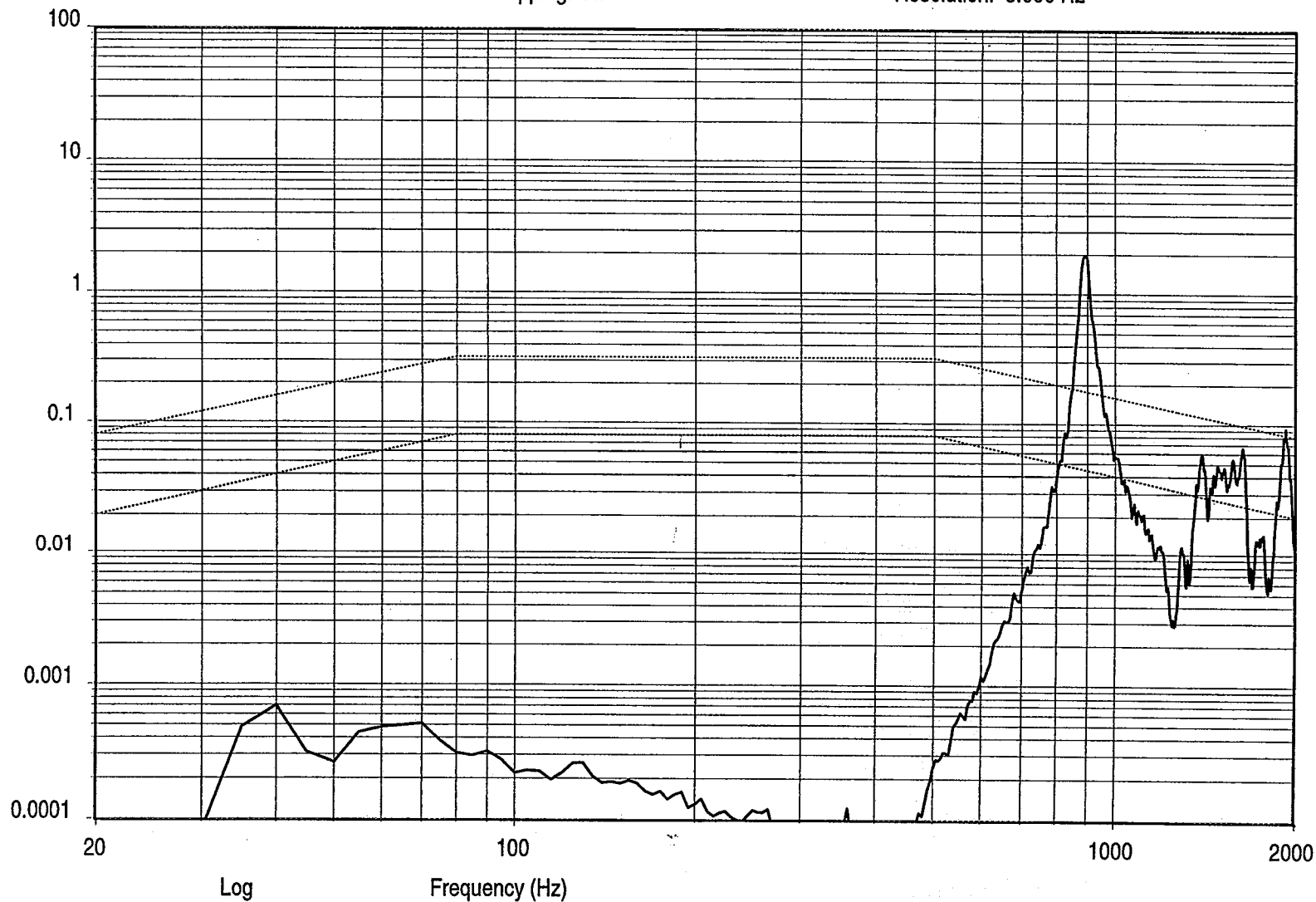
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 4

Log
 g^2/Hz

DOF 120

RMS:
11.190 g



14:51:06
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
X AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp



APR 07 1998

UNIT Y AXIS

Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 14:41:17

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping:

Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Abs (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT X AXIS	
3	Auxiliary	No	10.00	UNIT Z AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	No
H(f) Response Reference Label	
Pair Channel Channel	
1 3 2	3/CONTROL
2 4 2	4/CONTROL
3 5 2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618

Title 2: X AXIS TEST S/N F04, P/N 1348360-1 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

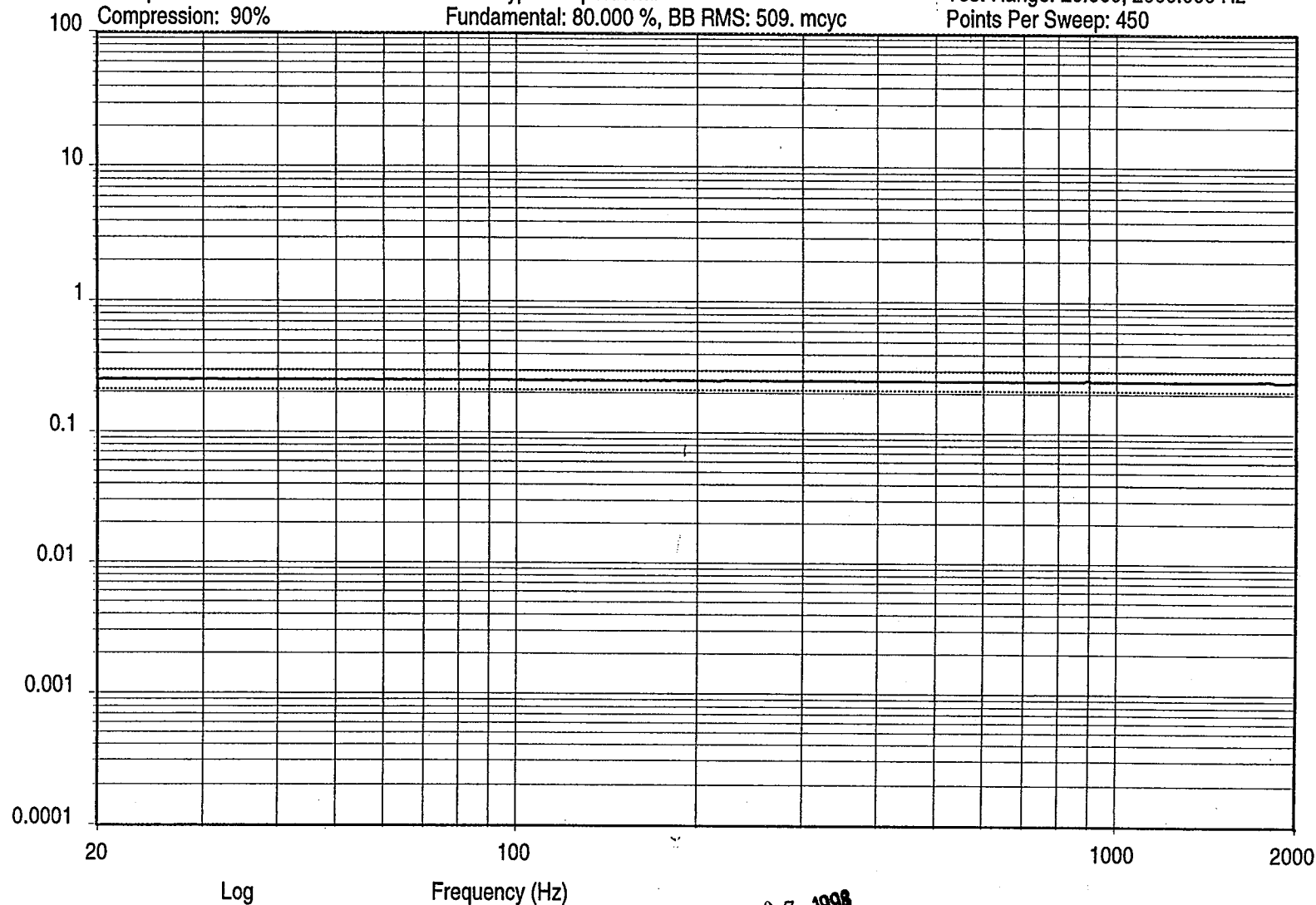
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



15:02:53
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

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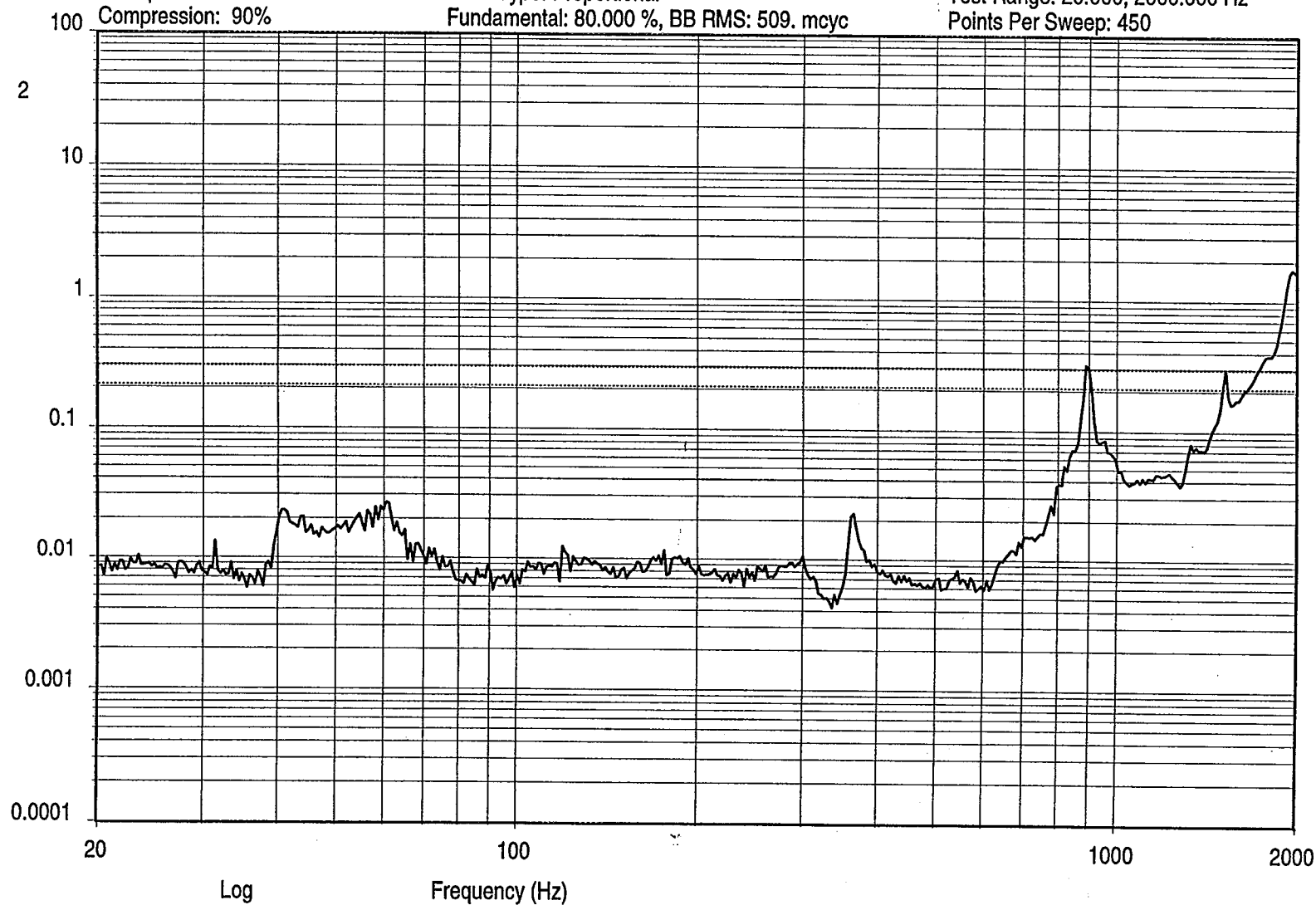
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



15:02:59
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229
APR 07 1998

Z AXIS

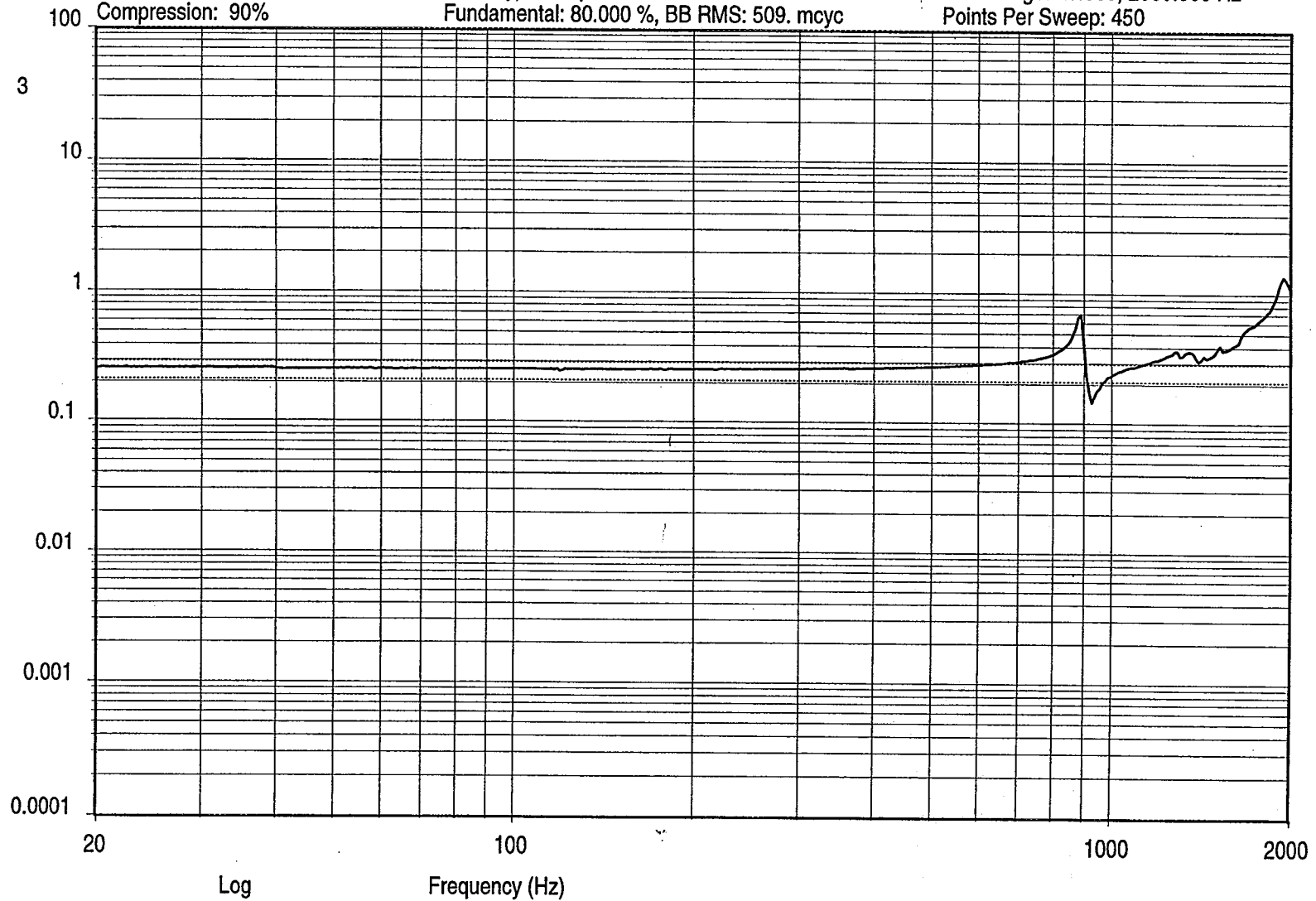
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



15:02:56
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

X AXIS

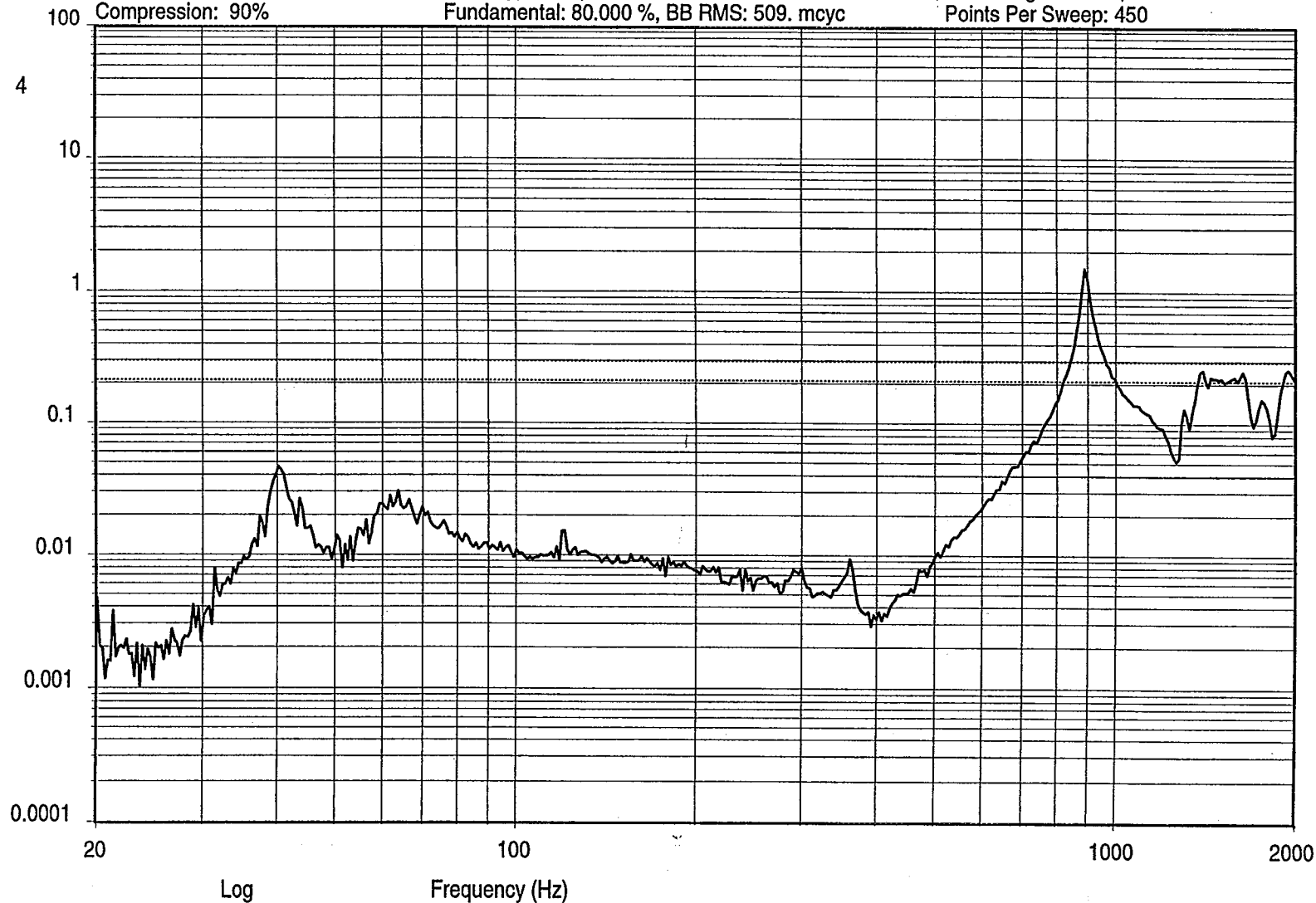
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



15:03:04
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

Y AXIS

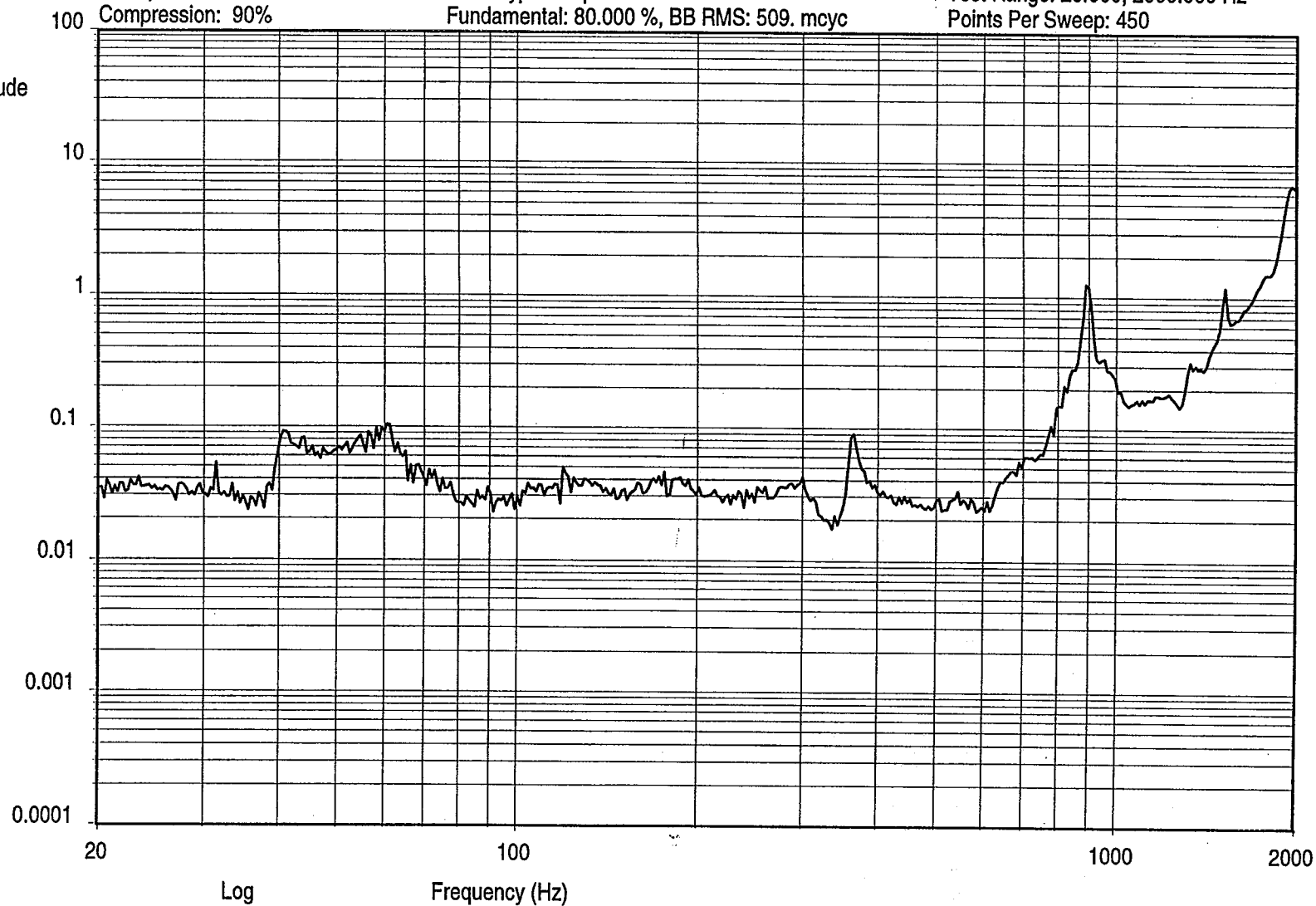
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



15:03:19
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL

ENG 229
7A 197
APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

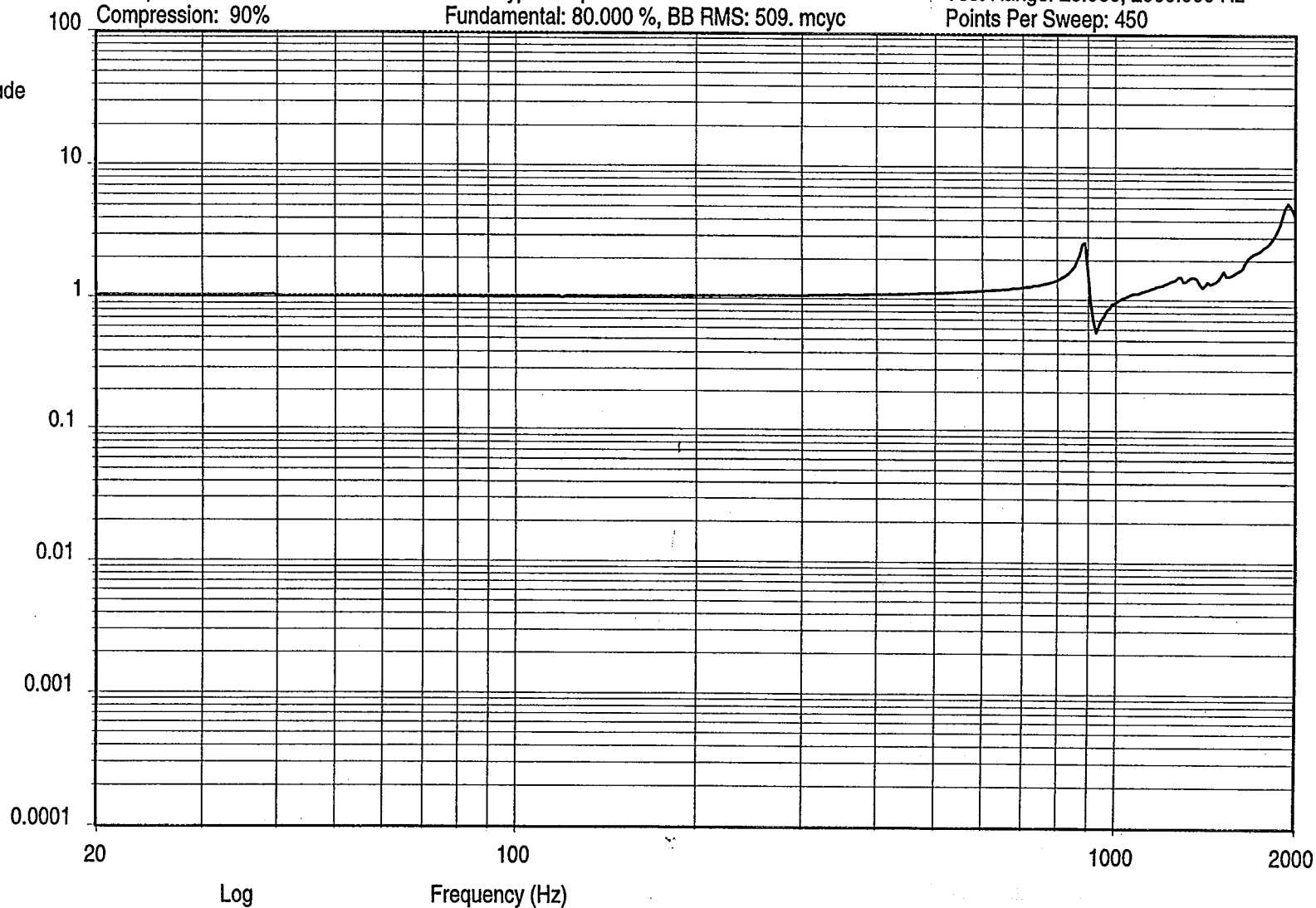
Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log

Ratio



15:03:23
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

3/CONTROL

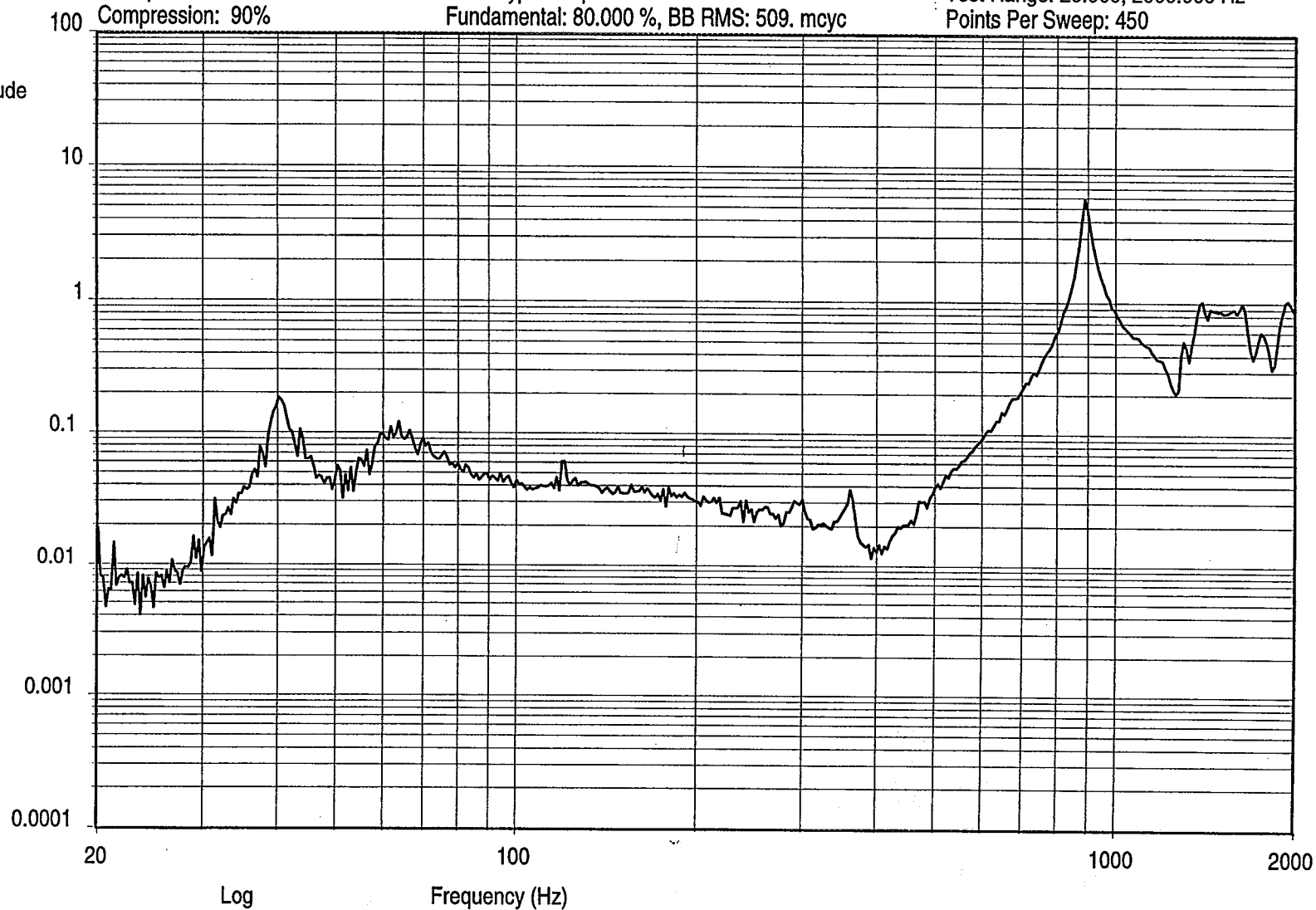
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:18
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:01
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



15:03:27
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST X SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 15:04:31

CONTROL PARAMETERS:

DURATION -
Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19
CONTROL STRATEGY -
Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc
EQUALIZATION -
Test Level: 0.00 dB
OPERATION MODE -
Manual Operation: Enable
STARTUP/SHUTDOWN -
Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB
COMPRESSION PARAMETERS -
Manual Override: Enable
Record Manual Changes: Disable
SWEEP PARAMETERS -
Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
Reference CSL Threshold: 20.00 dB
CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
Frequency: 100.00 Hz
Maximum Drive: 100.00 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation	Label 2
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	Z AXIS	
3	Auxiliary	No	10.00	X AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/CONTROL

DOCUMENTATION:

Display Text -
Title 1: AMSU PLO S/O 431618,P/N 1348360-1
Title 2: POST X SINE SWEEP S/N F04 METSAT
List Only Text -
Title 3:
Prompt before Test: Yes
Data Storage -
Storage Mode: Off
Message Log -
Log Mode: Off
Printing -
Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

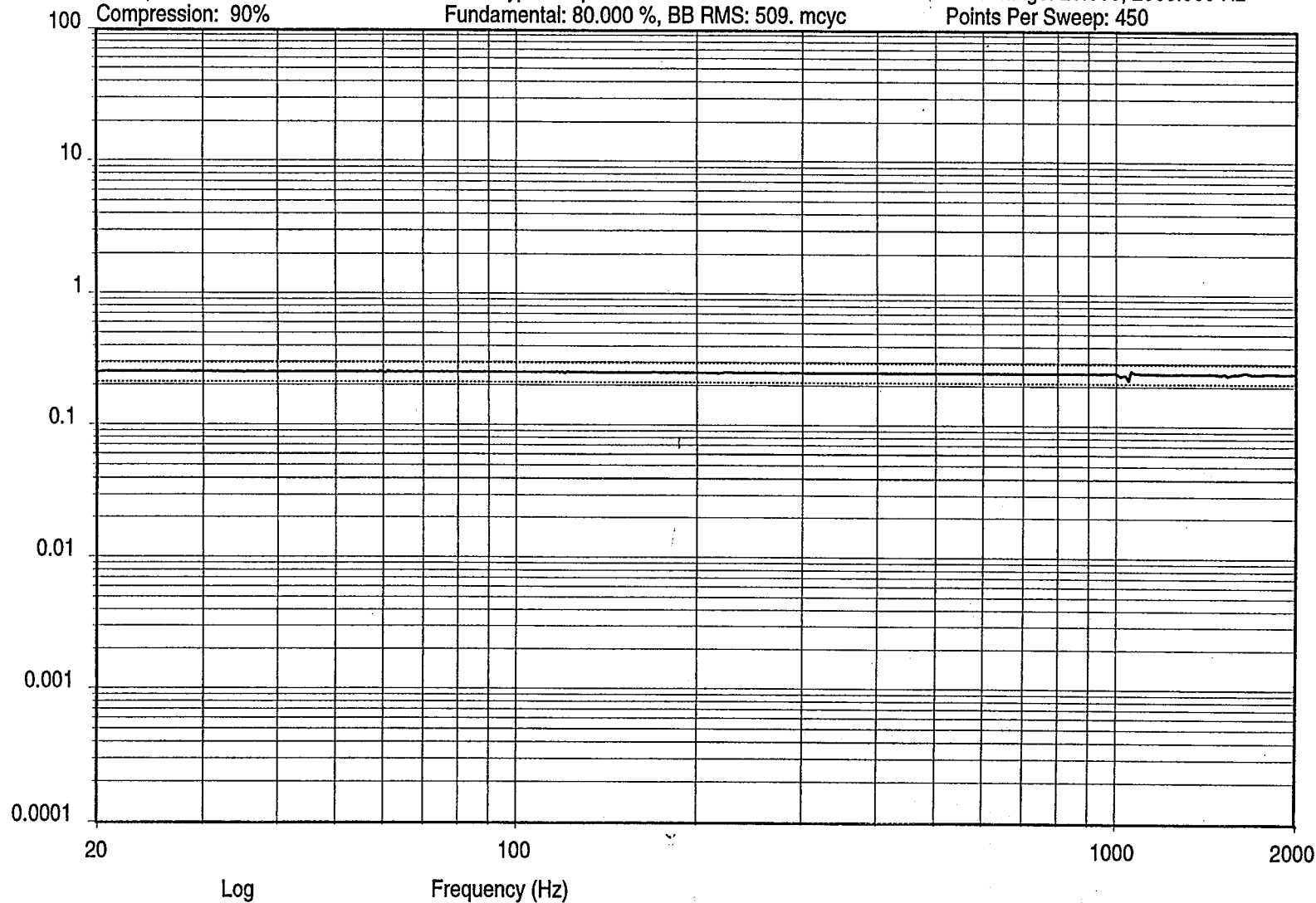
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



15:34:47
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

3

10

1

Log
Acceleration
g (0-pk)

0.1

0.01

0.001

0.0001

20

100

1000

2000

Log

Frequency (Hz)

15:34:50
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

X AXIS

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APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

10

1

Log
Acceleration
g (0-pk)

0.1

0.01

0.001

0.0001

20

100

1000

2000

Log

Frequency (Hz)

Z AXIS

15:34:54
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229
21
APR 07 1998

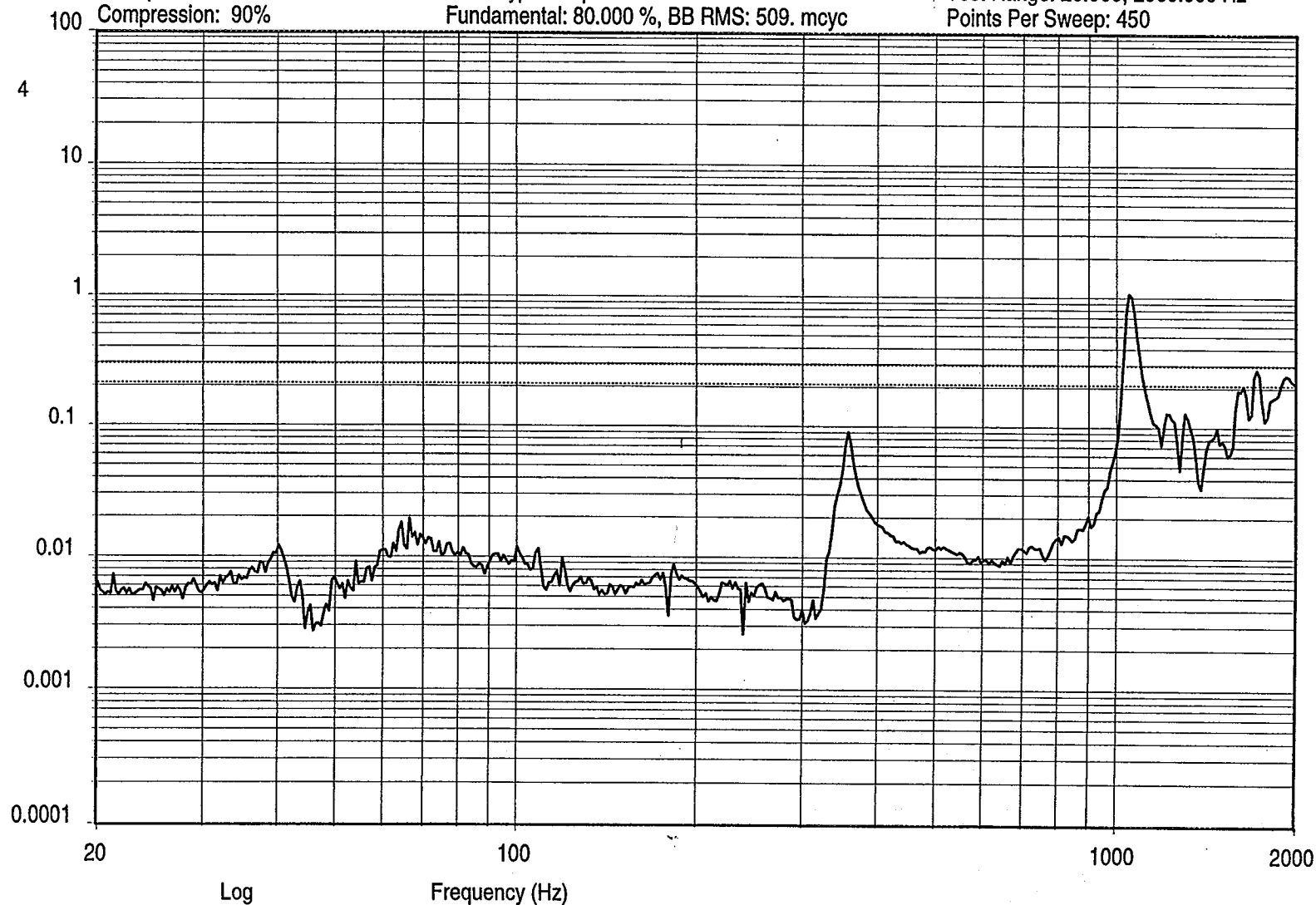
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



15:34:58
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229
7A 197
APR 07 1998

Y AXIS

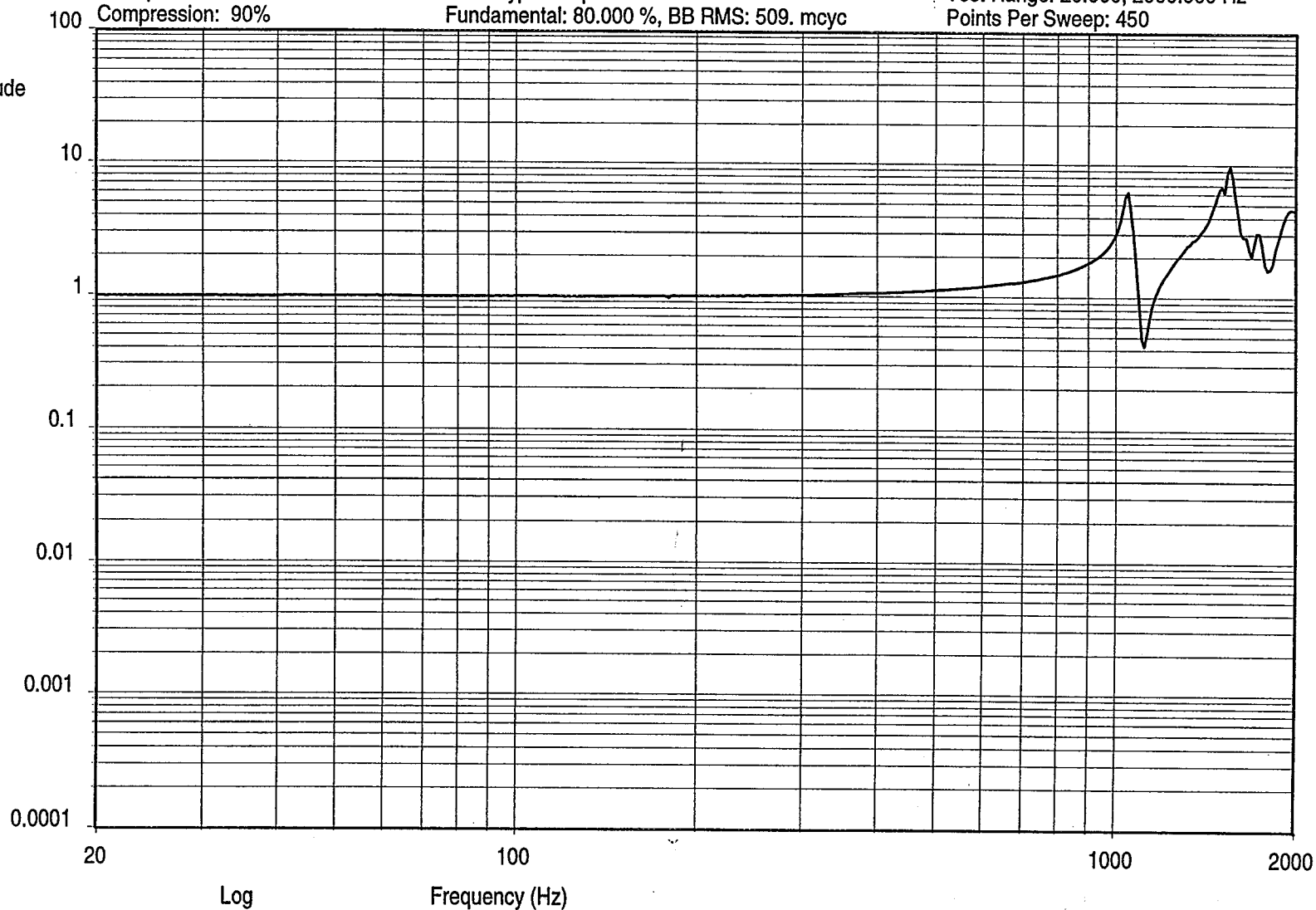
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



15:35:14
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



APR 07 1998

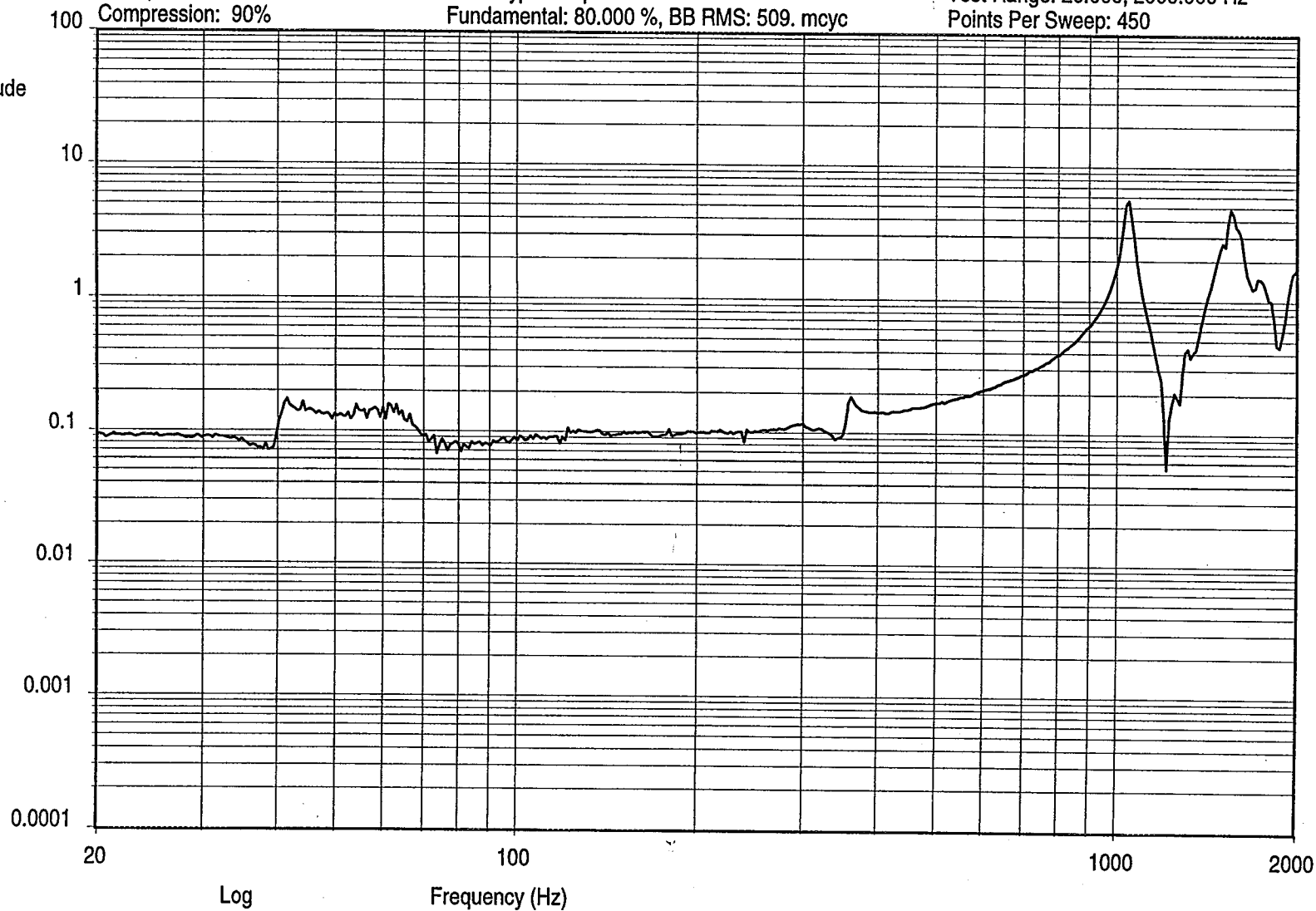
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log
Ratio



15:35:17
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

3/CONTROL

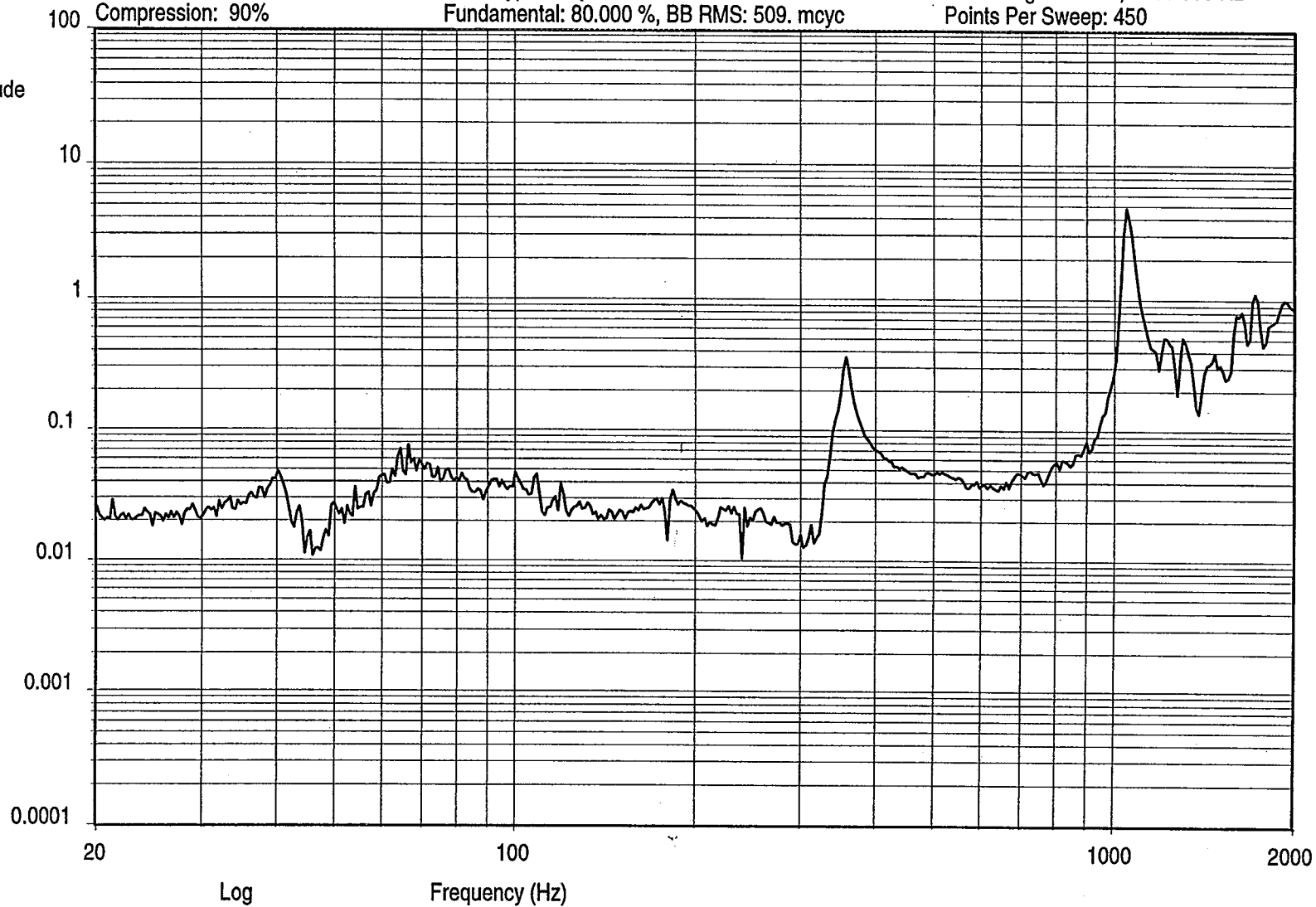
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



15:35:21
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG 229 197
APR 07 1998

4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 15:29:46

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	Z AXIS	
3	Auxiliary	No	10.00	X AXIS	
4	Auxiliary	No	10.00	Y AXIS	

Label 2

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -

Title 1: AMSU PLO S/O 431618,P/N 1348360-1
 Title 2: PRE Z SINE SWEEP S/N F04

METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Storage Mode: Off

Message Log -

Log Mode: Off

Printing -

Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

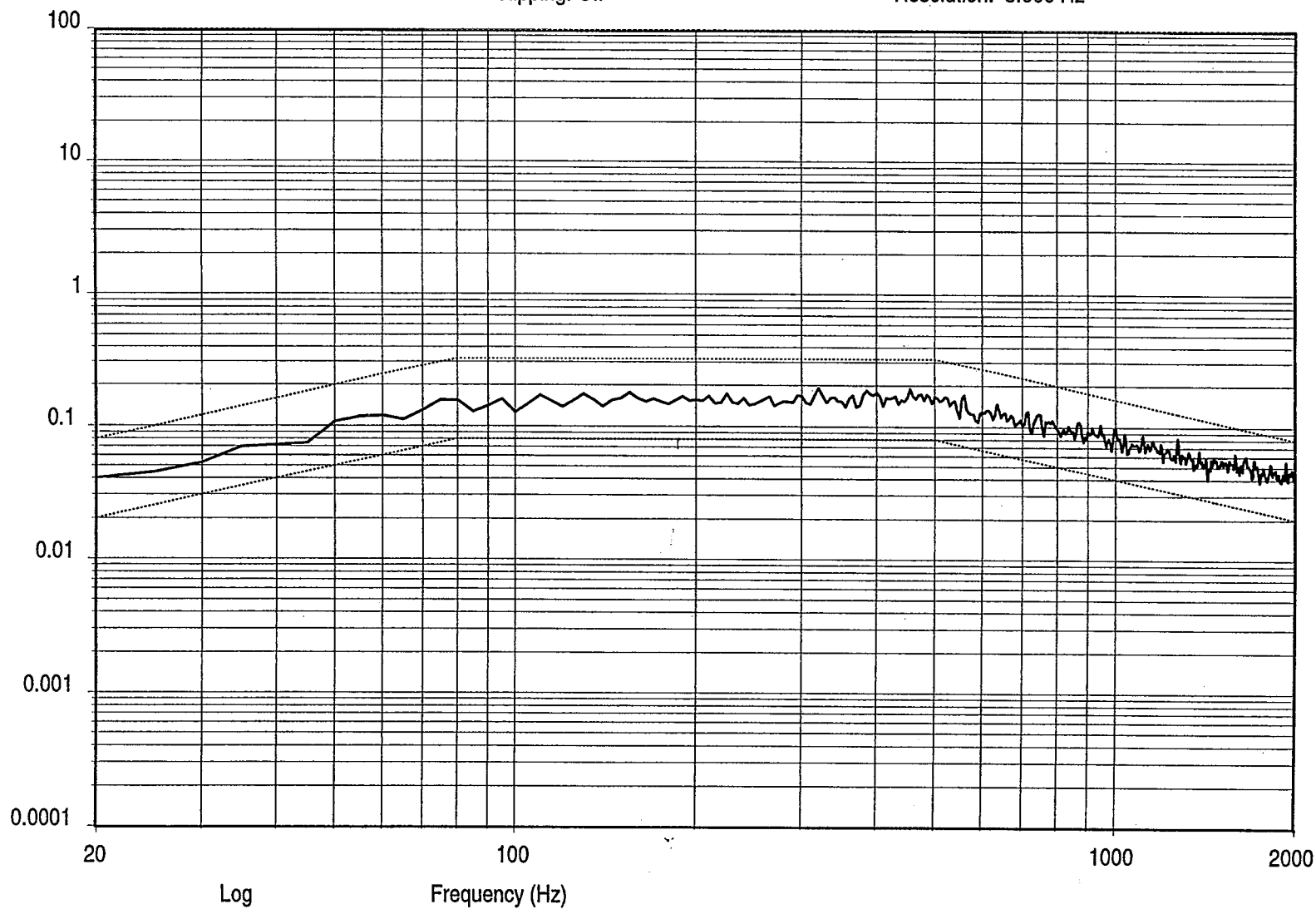
Log

g^2/Hz

DOF 200

RMS:

13.552 g



15:44:03
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Z AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

ENG
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197

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

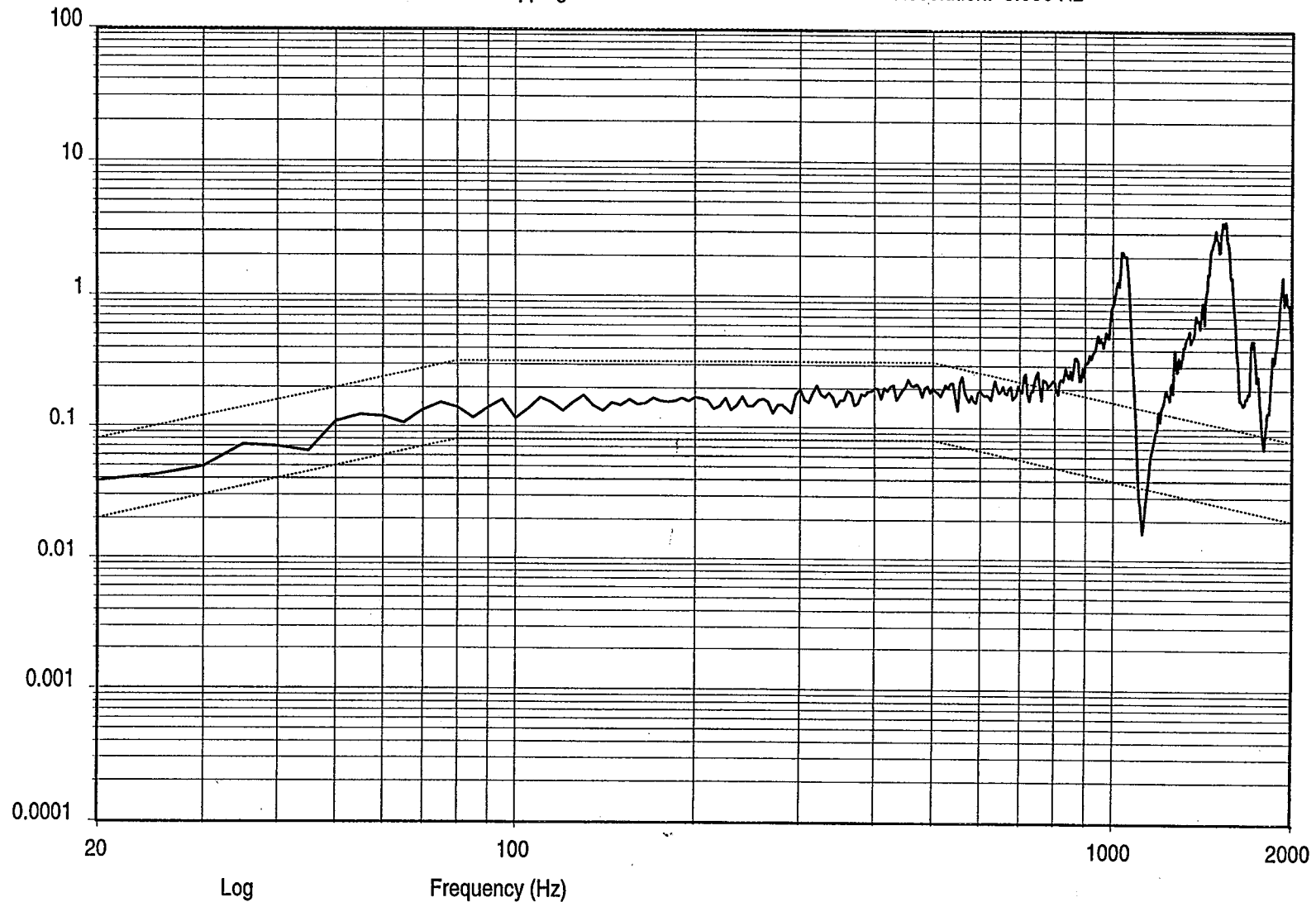
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 2

Log
 g^2/Hz

DOF 120

RMS:
31.371 g



15:44:15
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Z AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

UNIT Z AXIS

ENG
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17A
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APR 07 1998

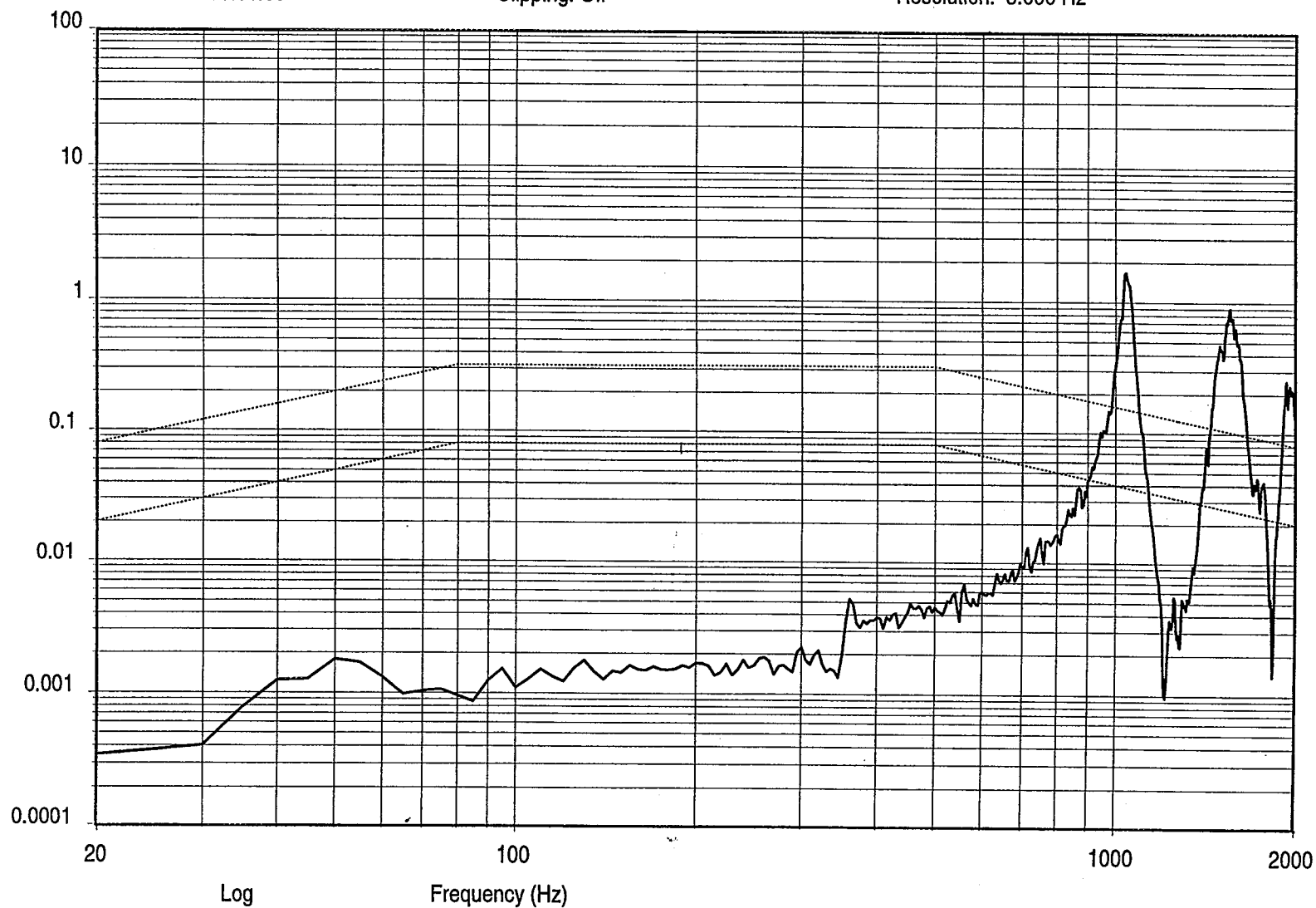
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 3

Log
 g^2/Hz
DOF 120
RMS:
15.001 g



15:44:06
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Z AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

ENG
229
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197
APR 07 1998

UNIT X AXIS

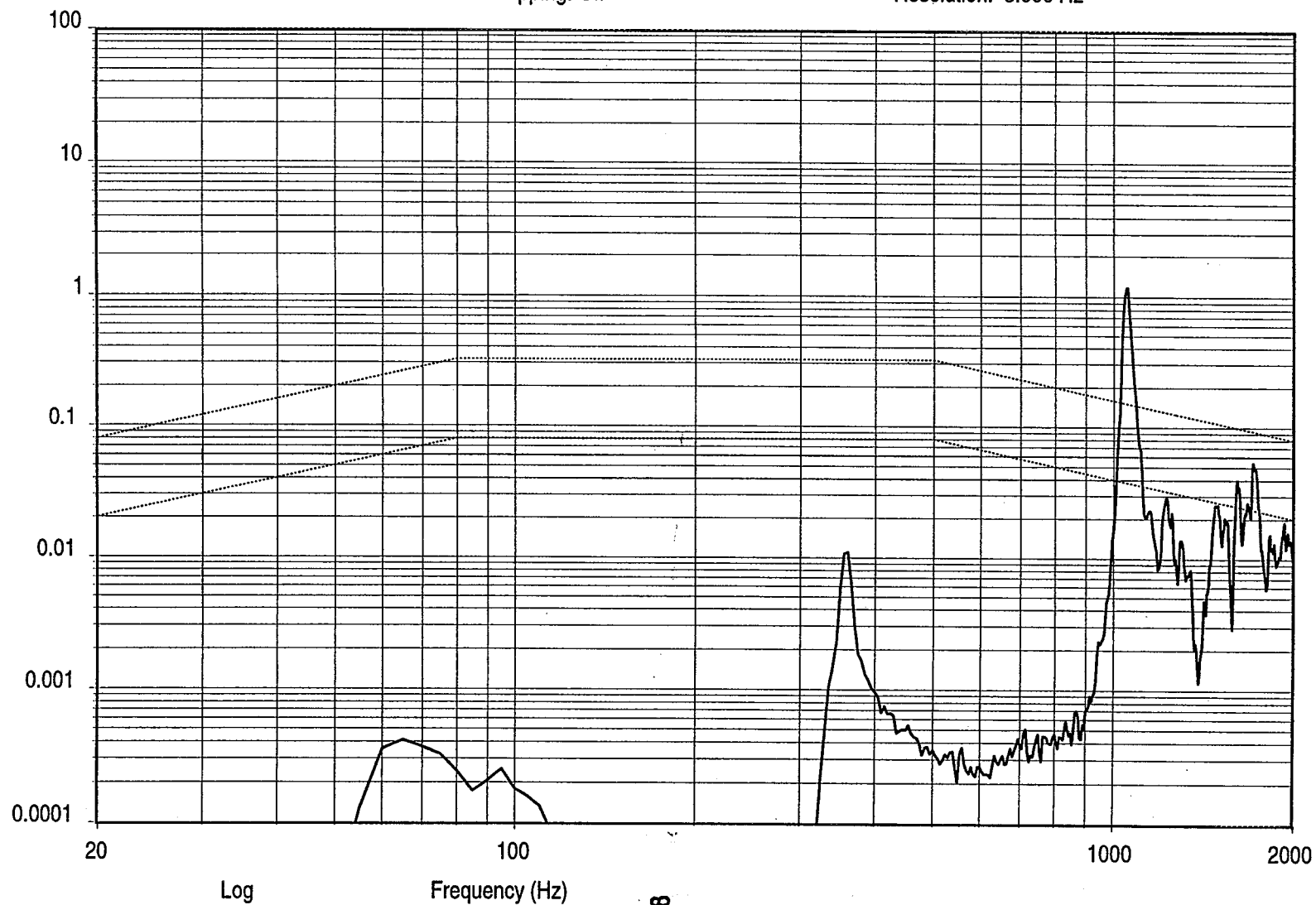
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 4

Log
 g^2/Hz
DOF 120
RMS:
7.591 g



15:44:11
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Z AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

APR 07 1998

ENG
229

TA
197

UNIT Y AXIS

Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 15:38:29

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping: Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Ab. (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT Z AXIS	
3	Auxiliary	No	10.00	UNIT X AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: No

H(f) Pair	Response Channel	Reference Channel	Label
1	3	2	3/CONTROL
2	4	2	4/CONTROL
3	5	2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618
 Title 2: Z AXIS TEST S/N F04, P/N 1348360-1 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

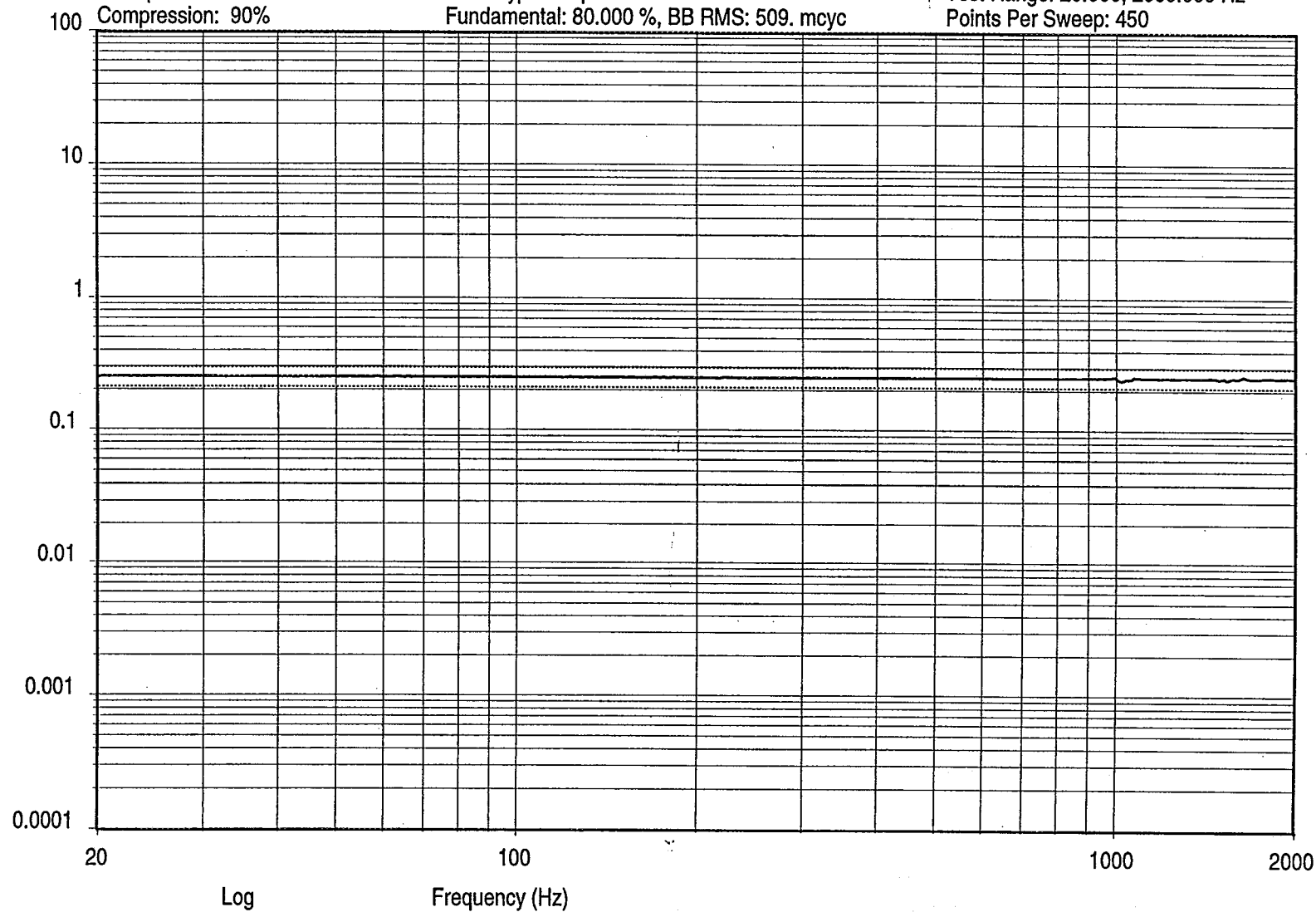
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



15:52:41
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG
229

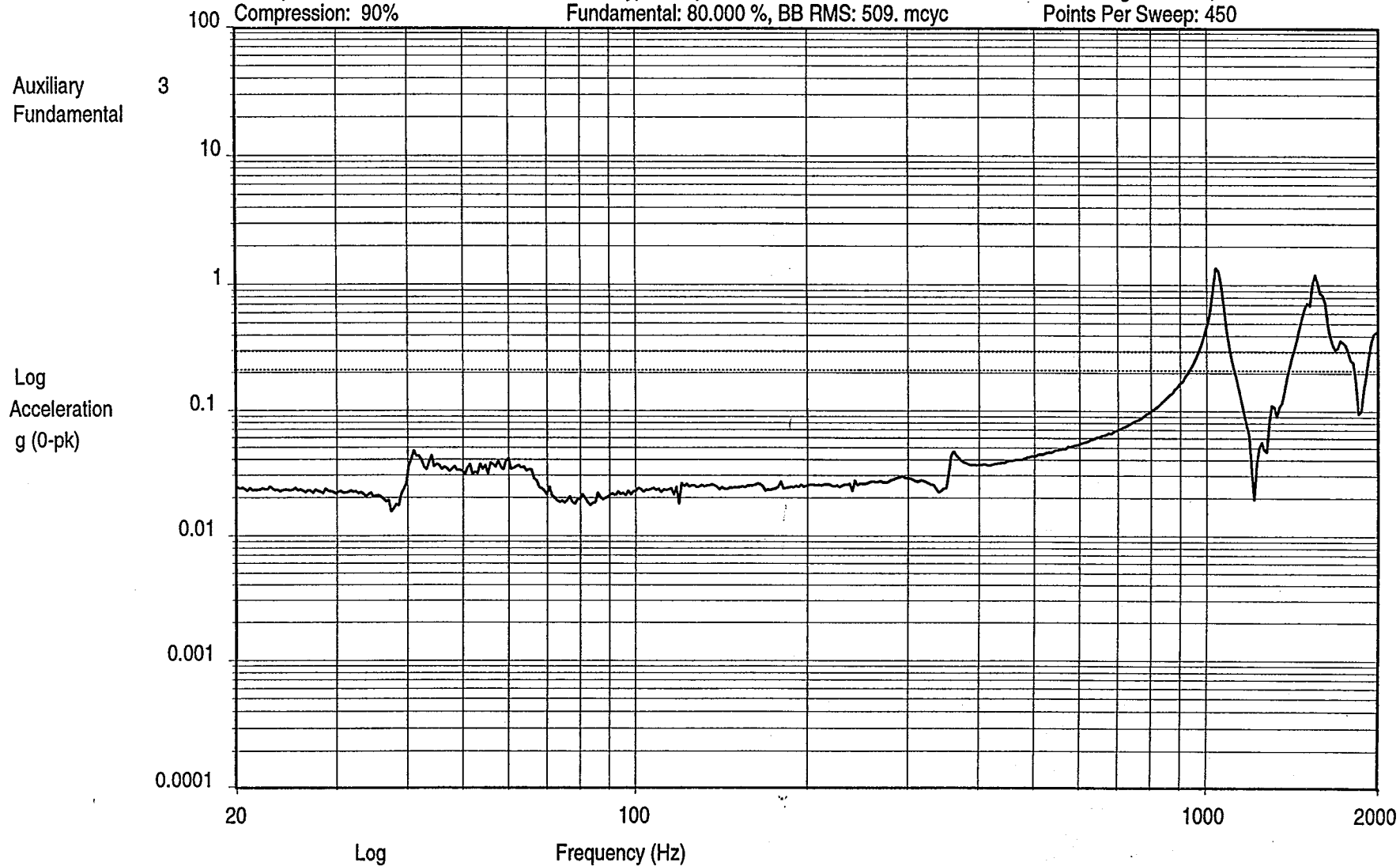
2A
197

APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450



15:52:43
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

X AXIS

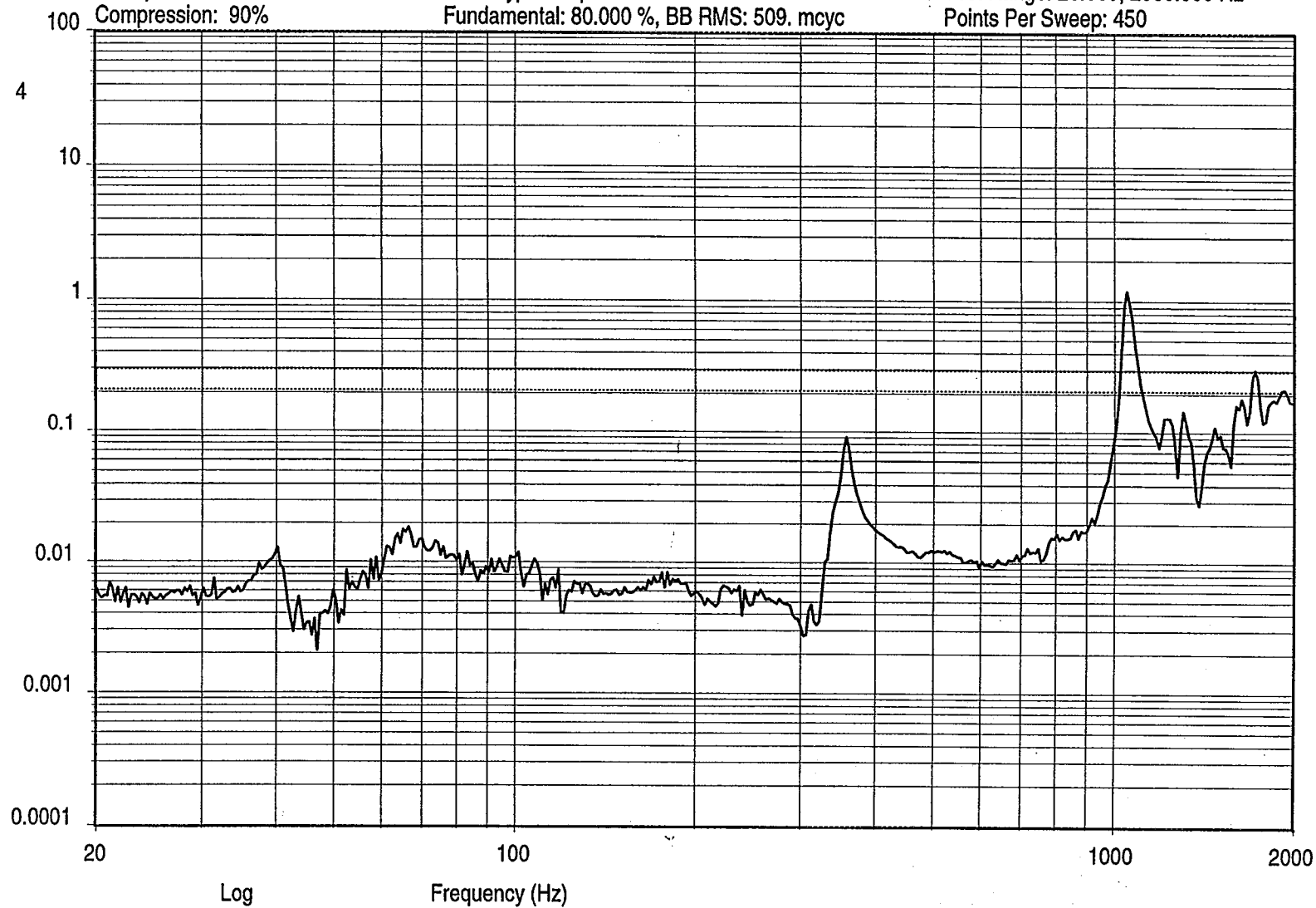
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



15:52:48
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG
229

7A
197

APR 07 1998

Y AXIS

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

10

1

Log
Acceleration
g (0-pk)

0.1

0.01

0.001

0.0001

20

100

1000

2000

Log

Frequency (Hz)

15:52:52
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

Z AXIS

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

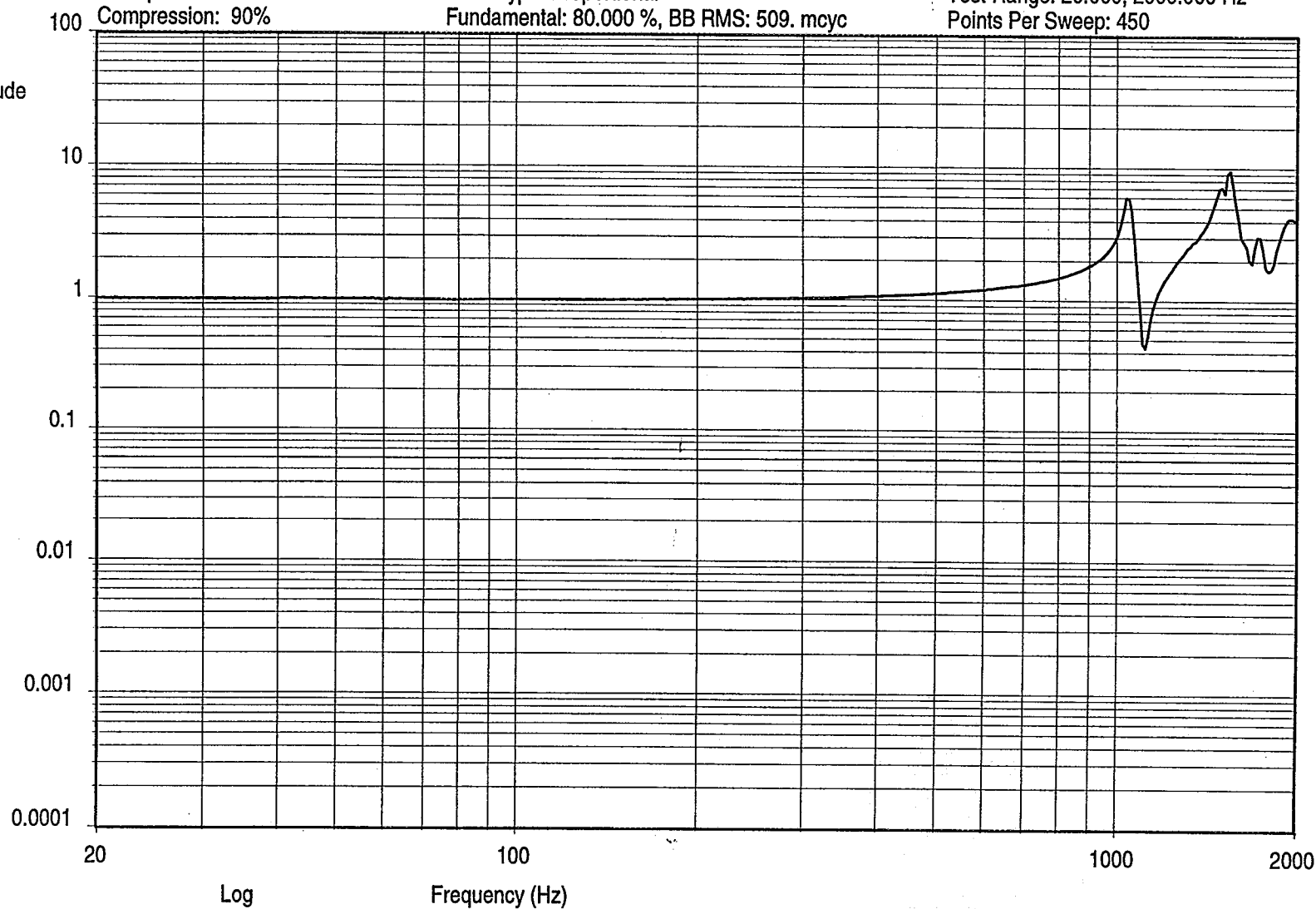
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log

Ratio



15:53:12
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

2/CONTROL

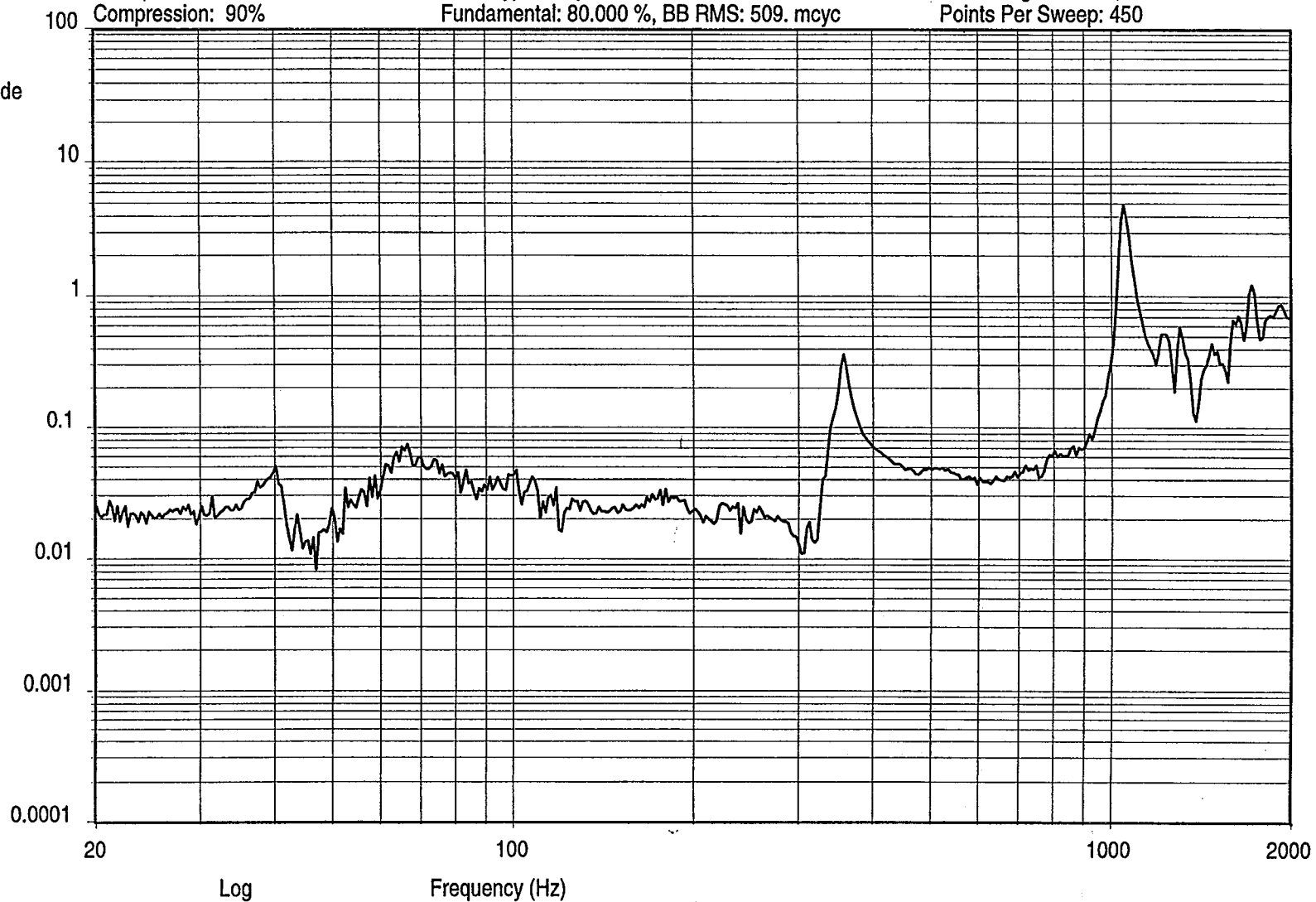
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



15:53:23
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG
229

7A
197

APR 07 1998

4/ CONTROL

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

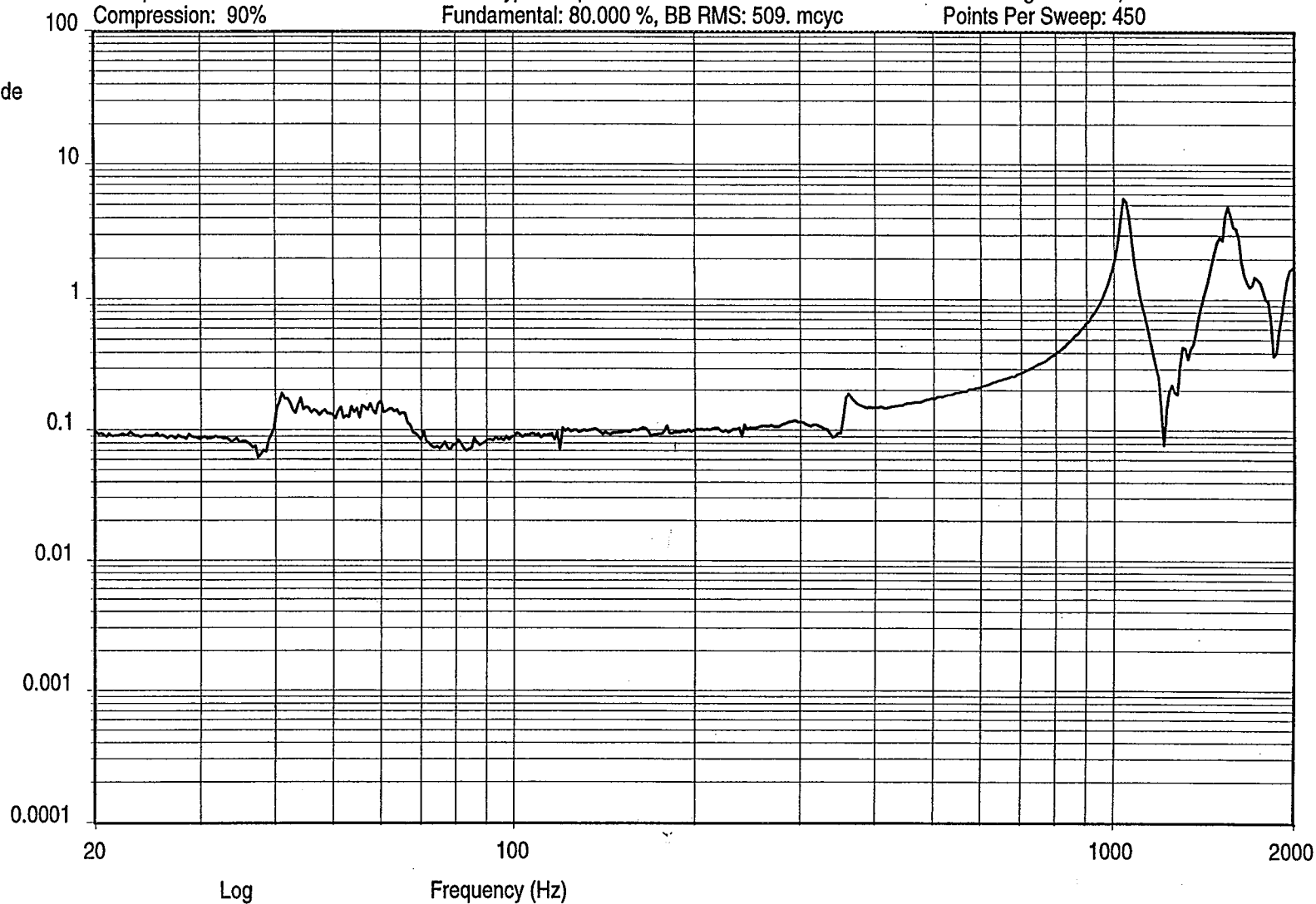
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 /Ch 1

Log

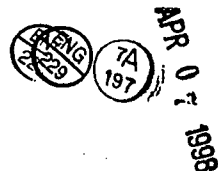
Ratio



15:53:19
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Z SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 15:46:42

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label 1	Documentation Label 2
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	Z AXIS	
3	Auxiliary	No	10.00	X AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -
 Title 1: AMSU PLO S/O 431618,P/N 1348360-1
 Title 2: POST Z SINE SWEEP S/N F04 METSAT
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Off
 Message Log -
 Log Mode: Off
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

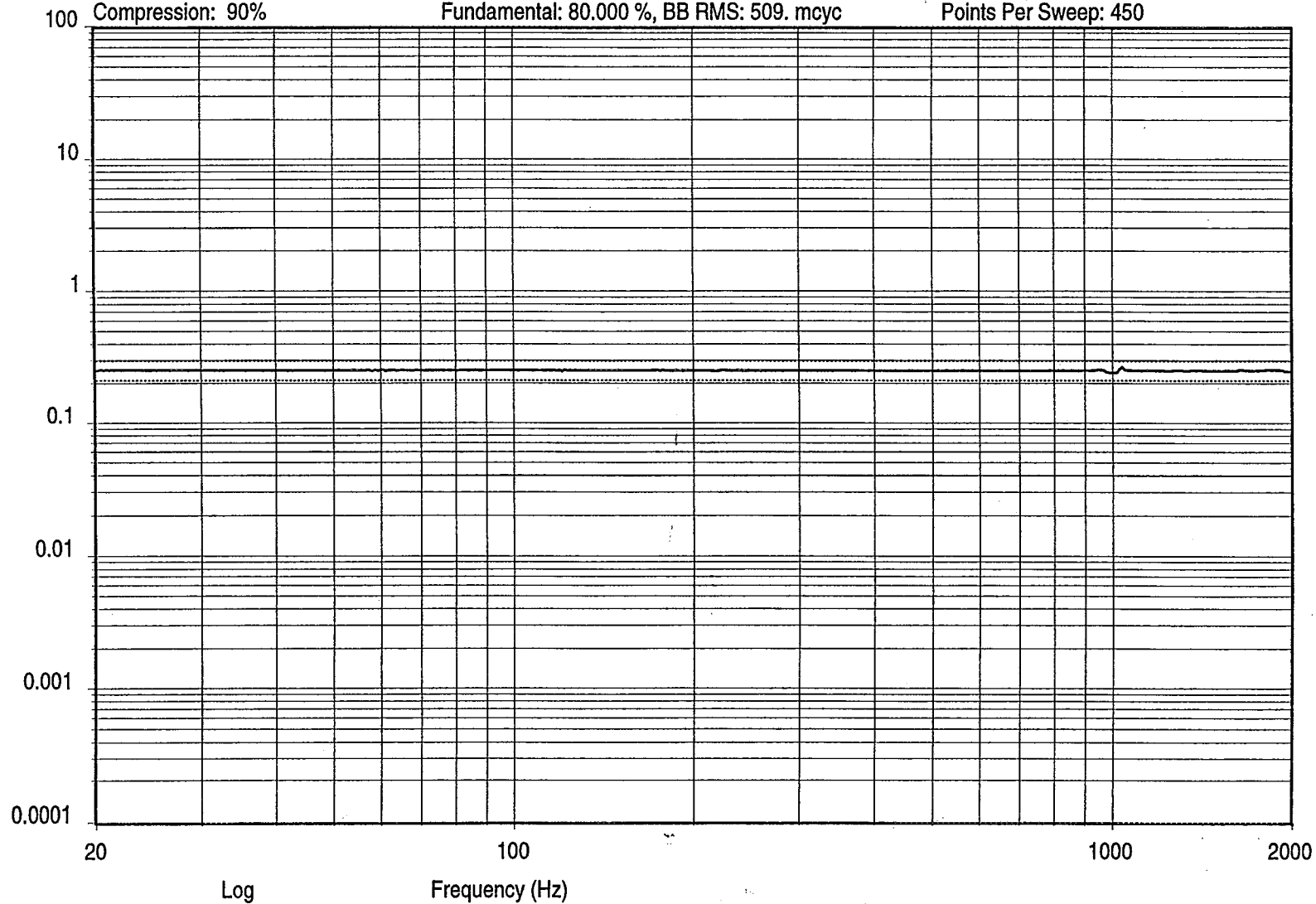
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Control

Log
Acceleration
g (0-pk)



16:14:49
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

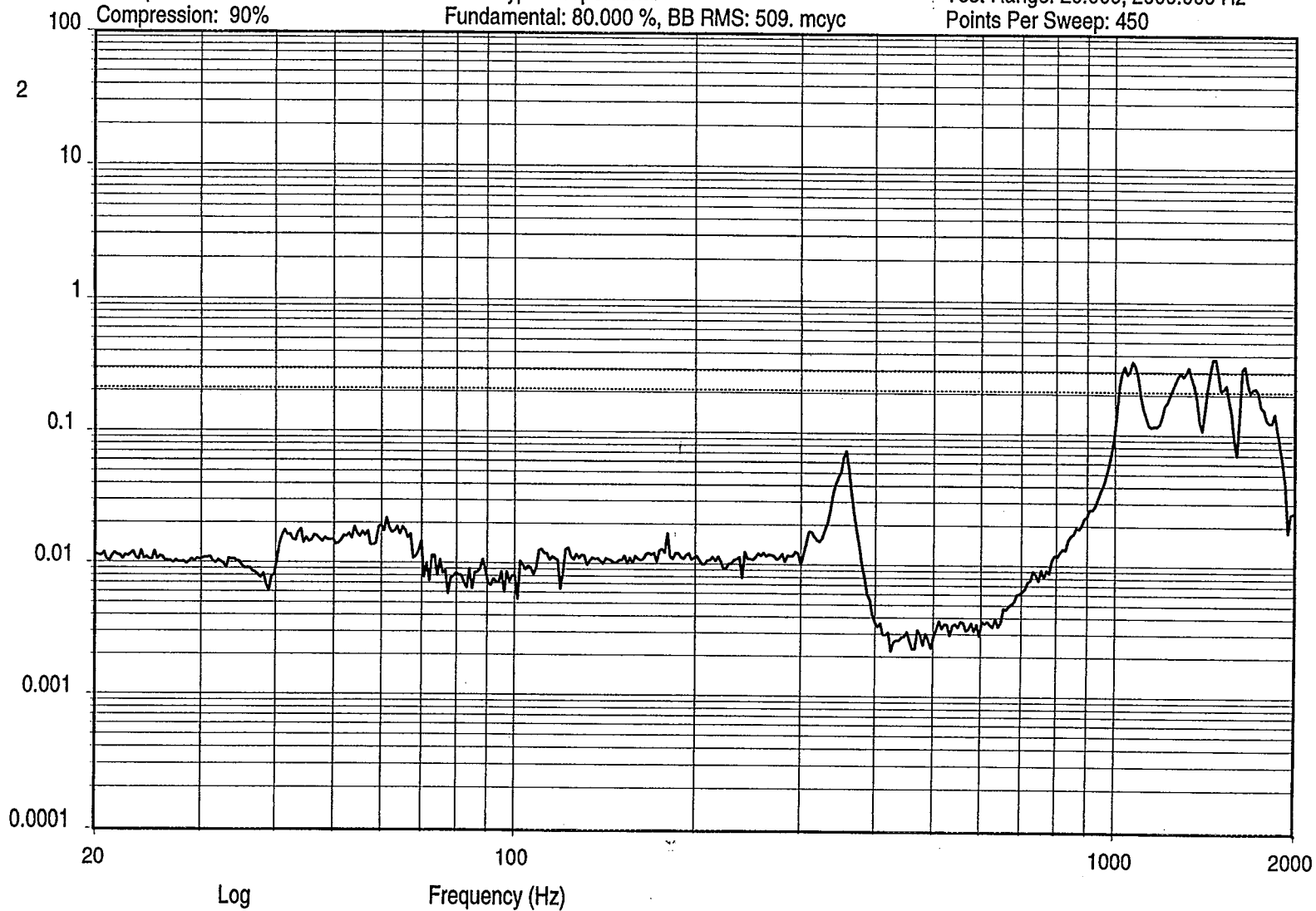
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

Log
Acceleration
g (0-pk)



16:14:56
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG
229

7A
197

APR 07 1998

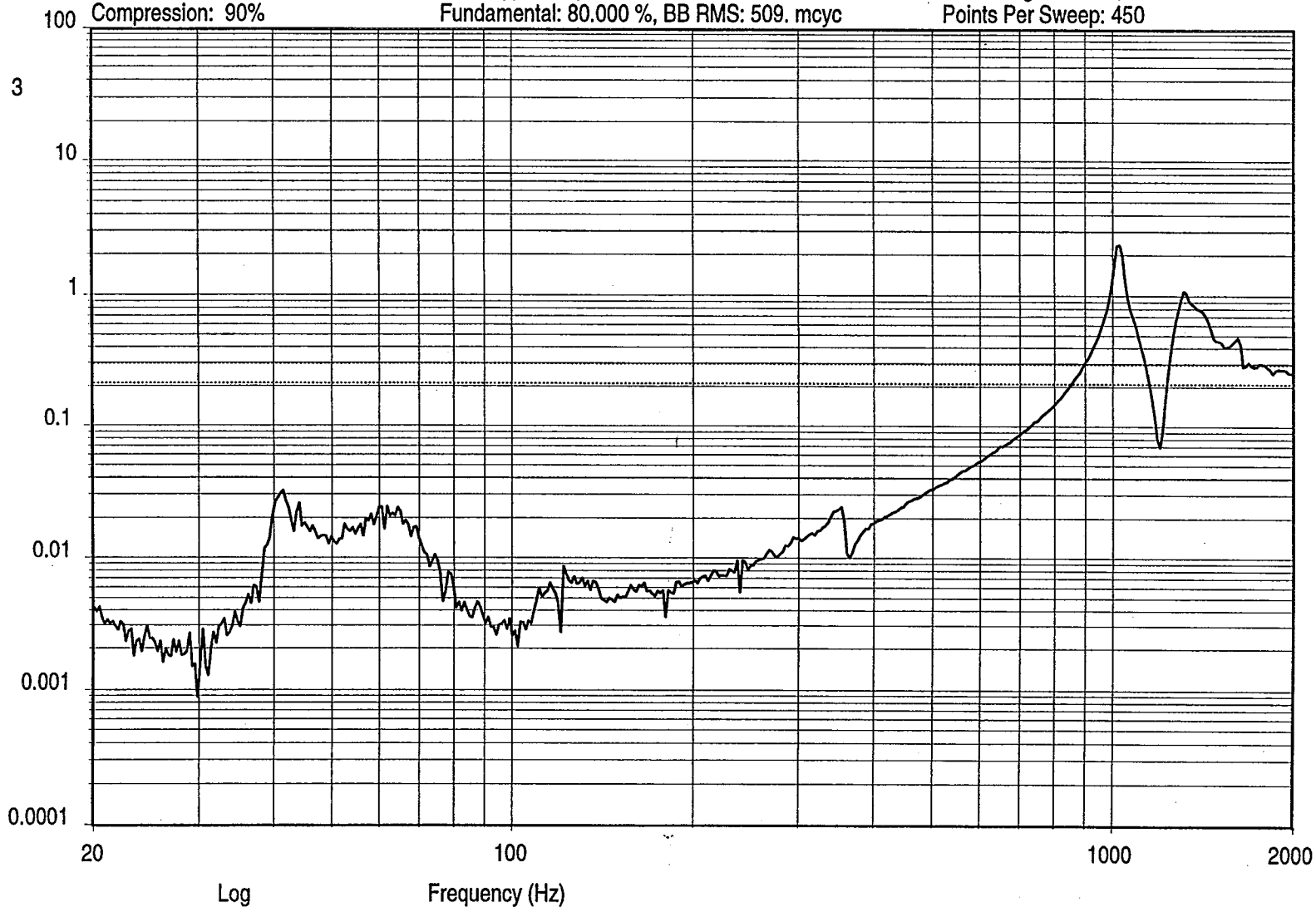
Z AXIS

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

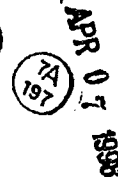
Auxiliary
Fundamental



16:14:51
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

X AXIS



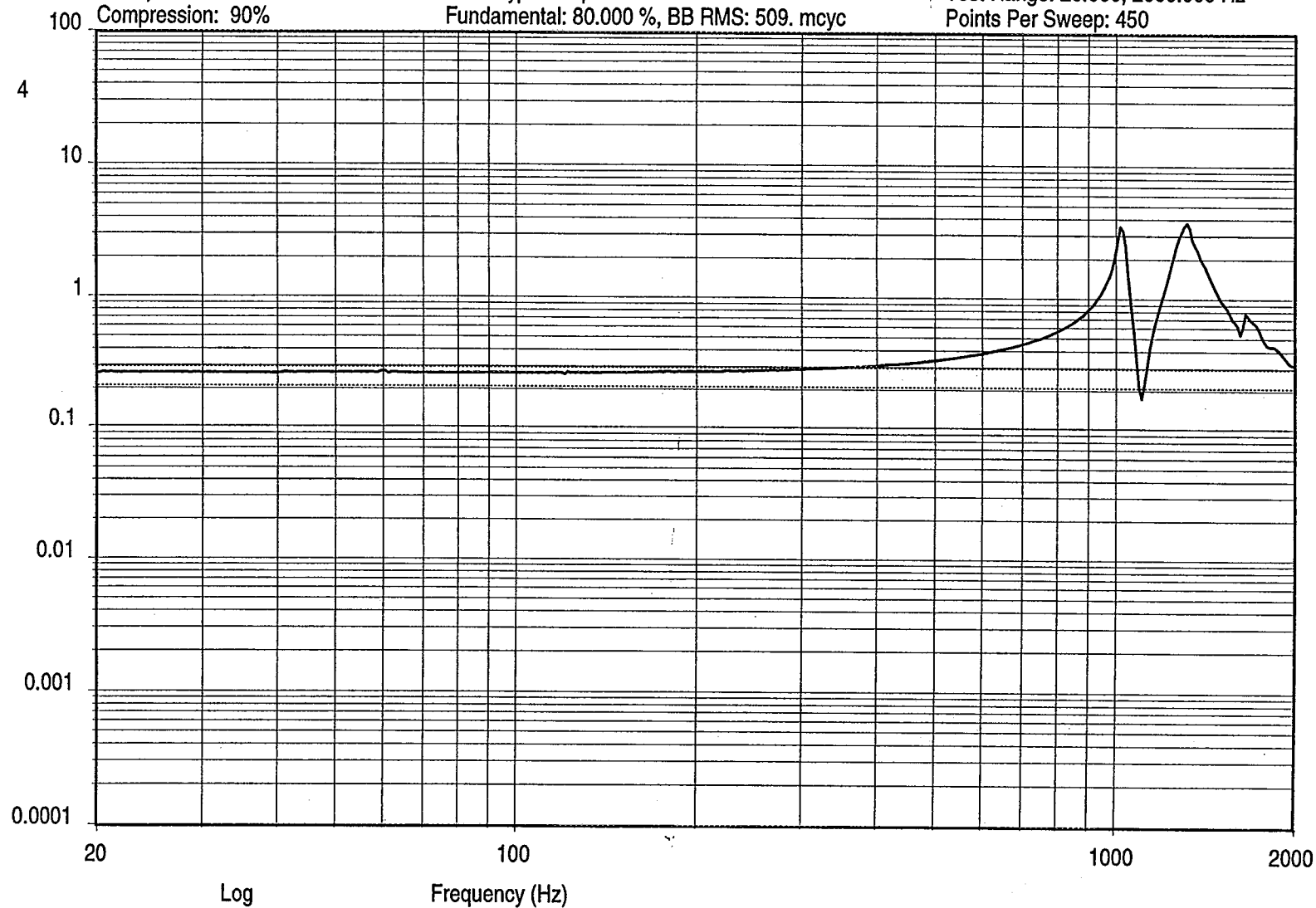
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



Y AXIS

16:15:01
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

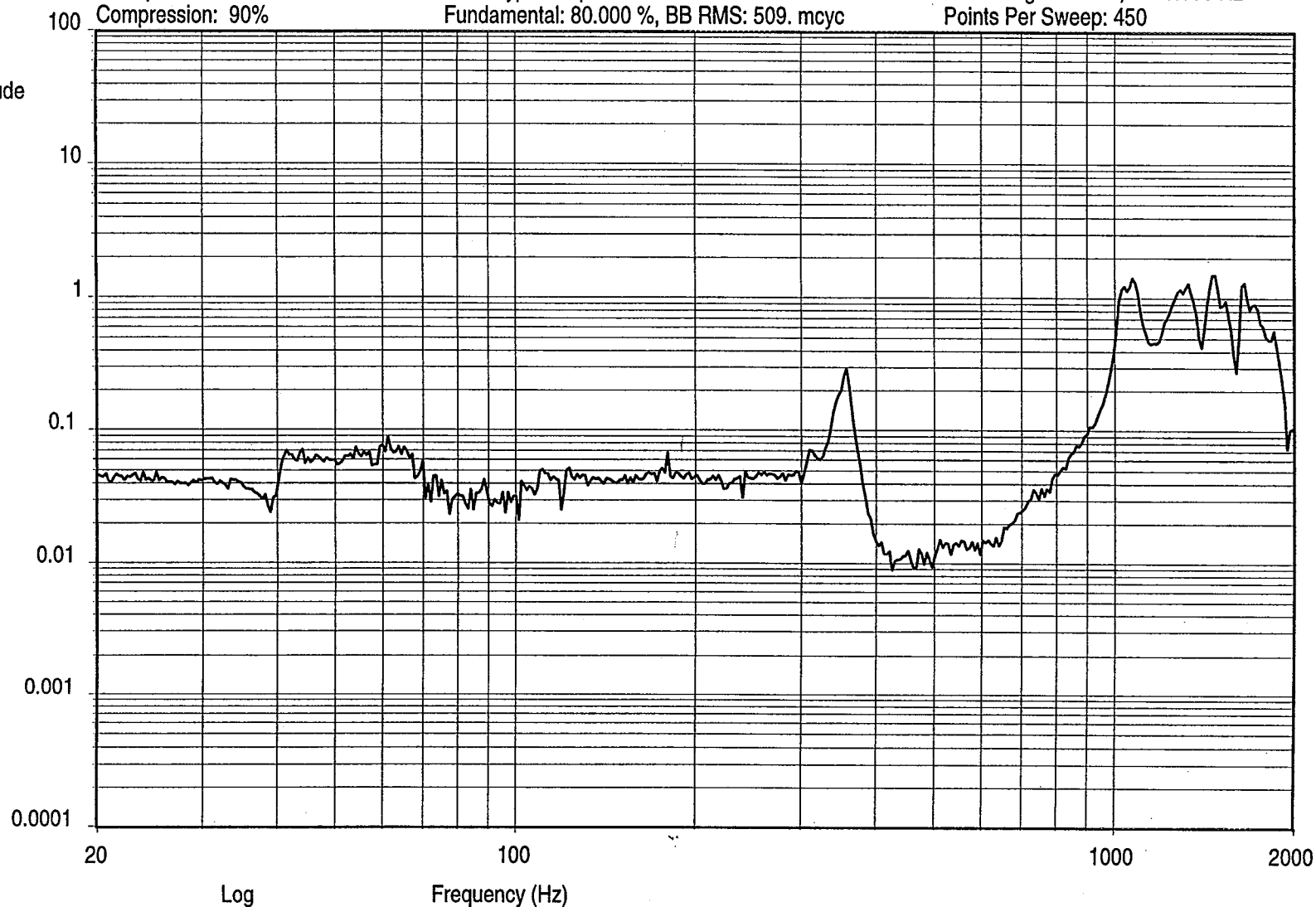
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 / Ch 1

Log
Ratio



16:15:39
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



APR 07 1998

Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

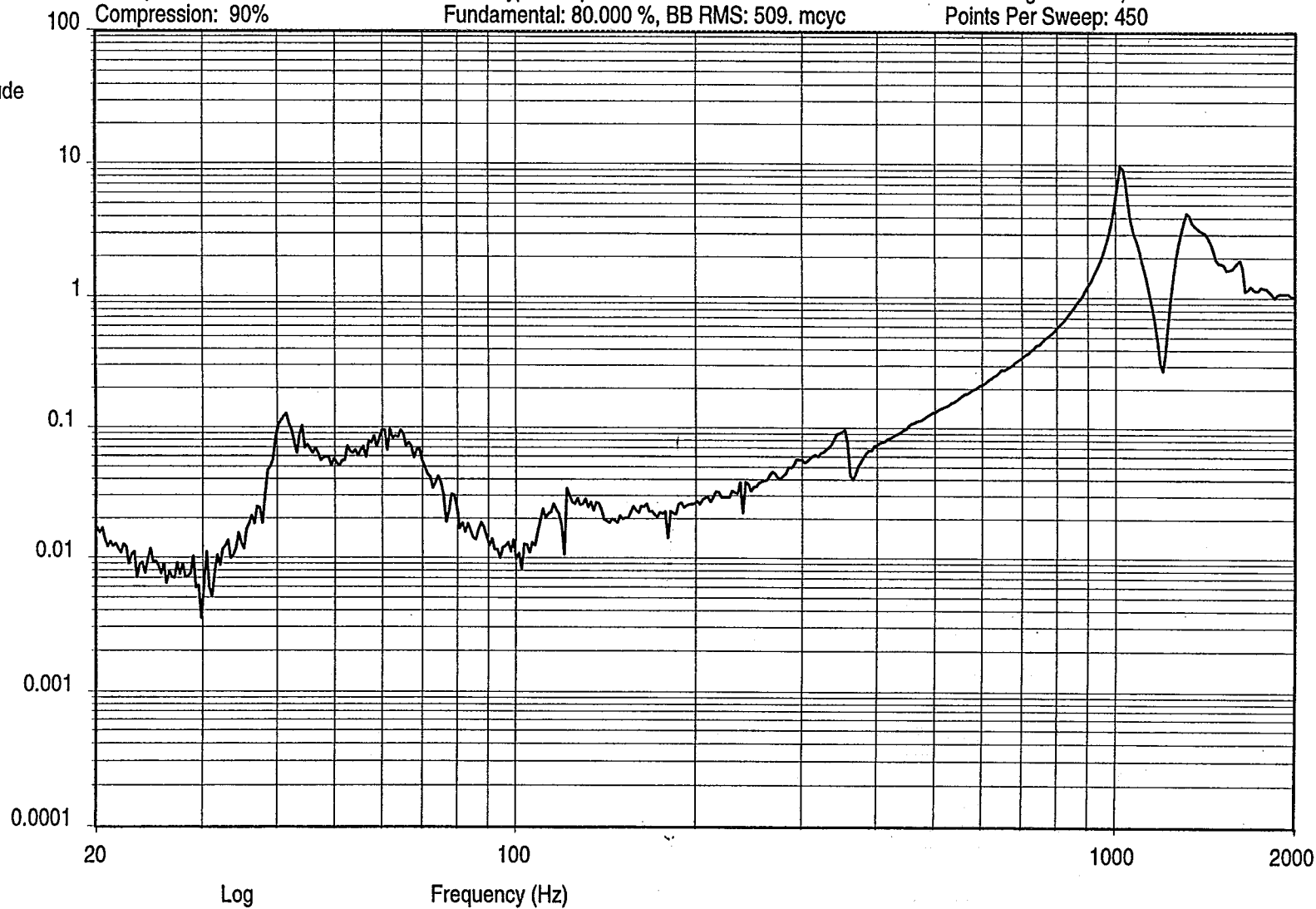
Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 /Ch 1

Log

Ratio



16:15:42
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



APR 07 1998

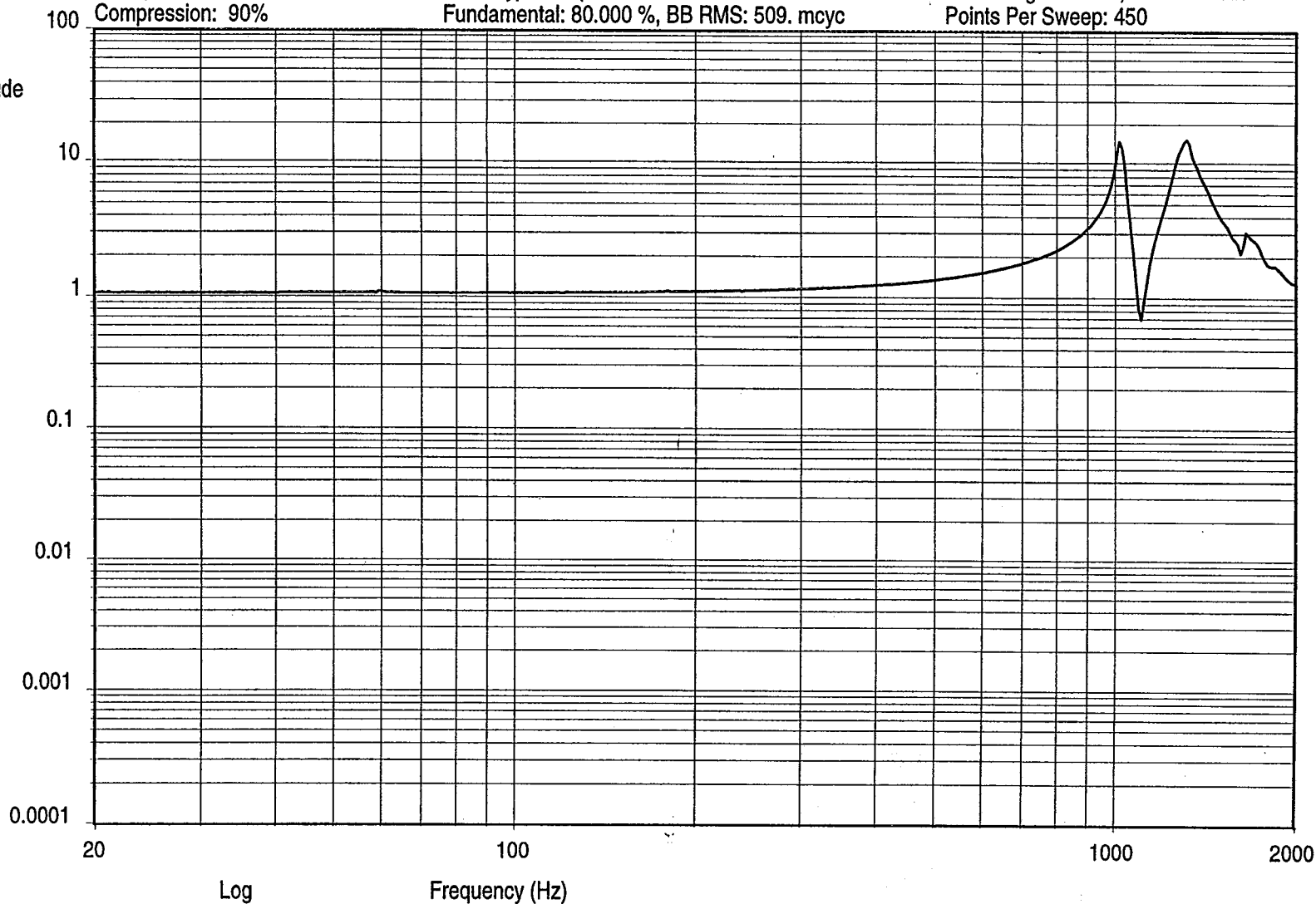
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



16:15:46
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
PRE Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

4/ CONTROL

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 16:09:41

CONTROL PARAMETERS:

DURATION -

Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -

Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -

Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
Reference CSL Threshold: 20.00 dB
CSL Count Threshold: 5

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
Frequency: 100.00 Hz
Maximum Drive: 100.00 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 10.00 Vpeak
Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	100.00	Nullled DC	Acceler g		0.00		Fundamental
2	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
3	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental
4	Auxiliary	No	10.00	Nullled DC	Acceler g				Fundamental

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label 1	Documentation Label 2
1.	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	Z AXIS	
3	Auxiliary	No	10.00	X AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: Yes

H(f) Pair	Response Channel	Reference Channel	Label
1	2	1	2/CONTROL
2	3	1	3/CONTROL
3	4	1	4/ CONTROL

DOCUMENTATION:

Display Text -
Title 1: AMSU PLO S/O 431618,P/N 1348360-1
Title 2: PRE Y SINE SWEEP S/N F04 METSAT
List Only Text -
Title 3:
Prompt before Test: Yes
Data Storage -
Storage Mode: Off
Message Log -
Log Mode: Off
Printing -
Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

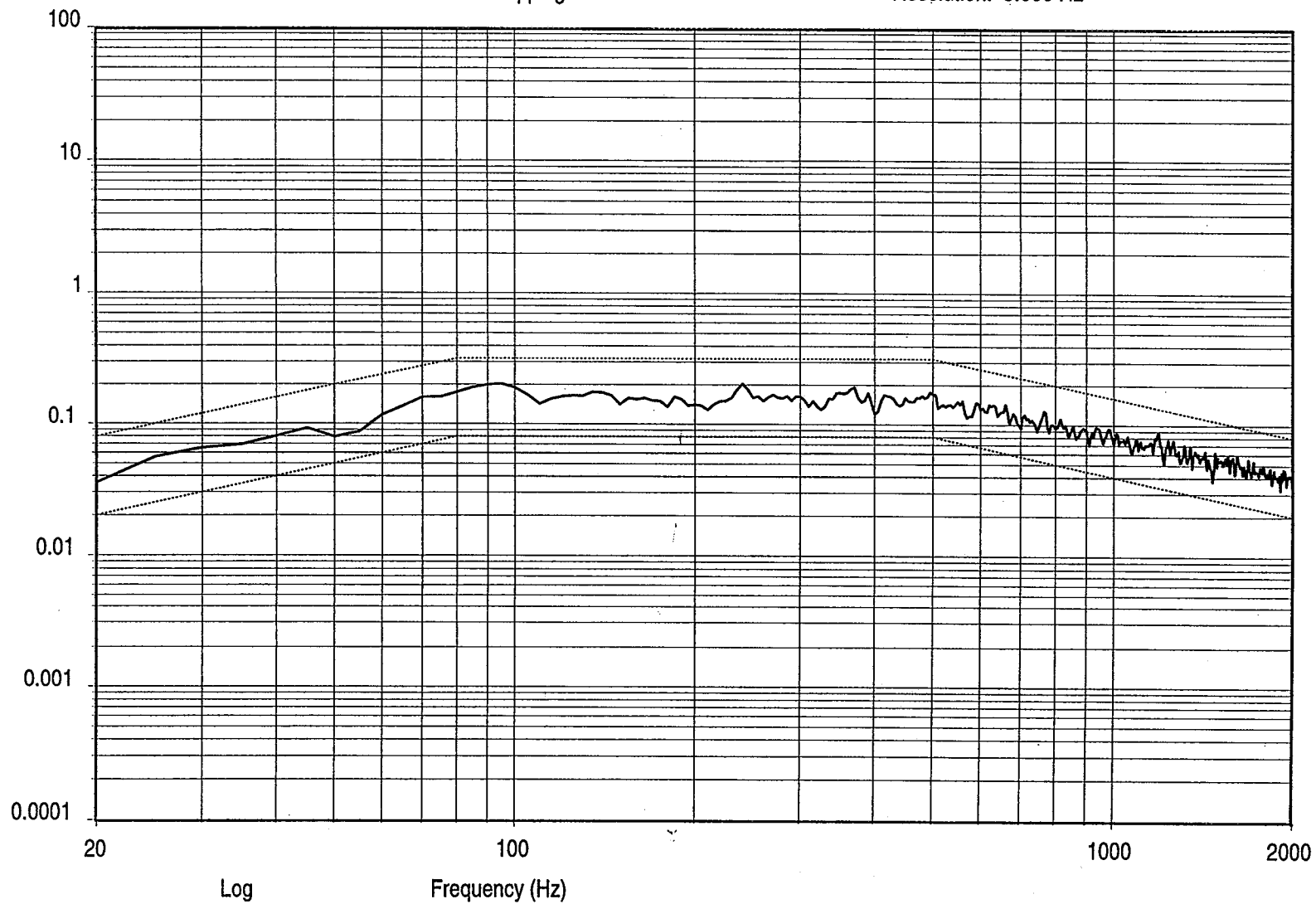
Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Control

Log
 g^2/Hz

DOF 200

RMS:
13.522 g



16:23:53
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

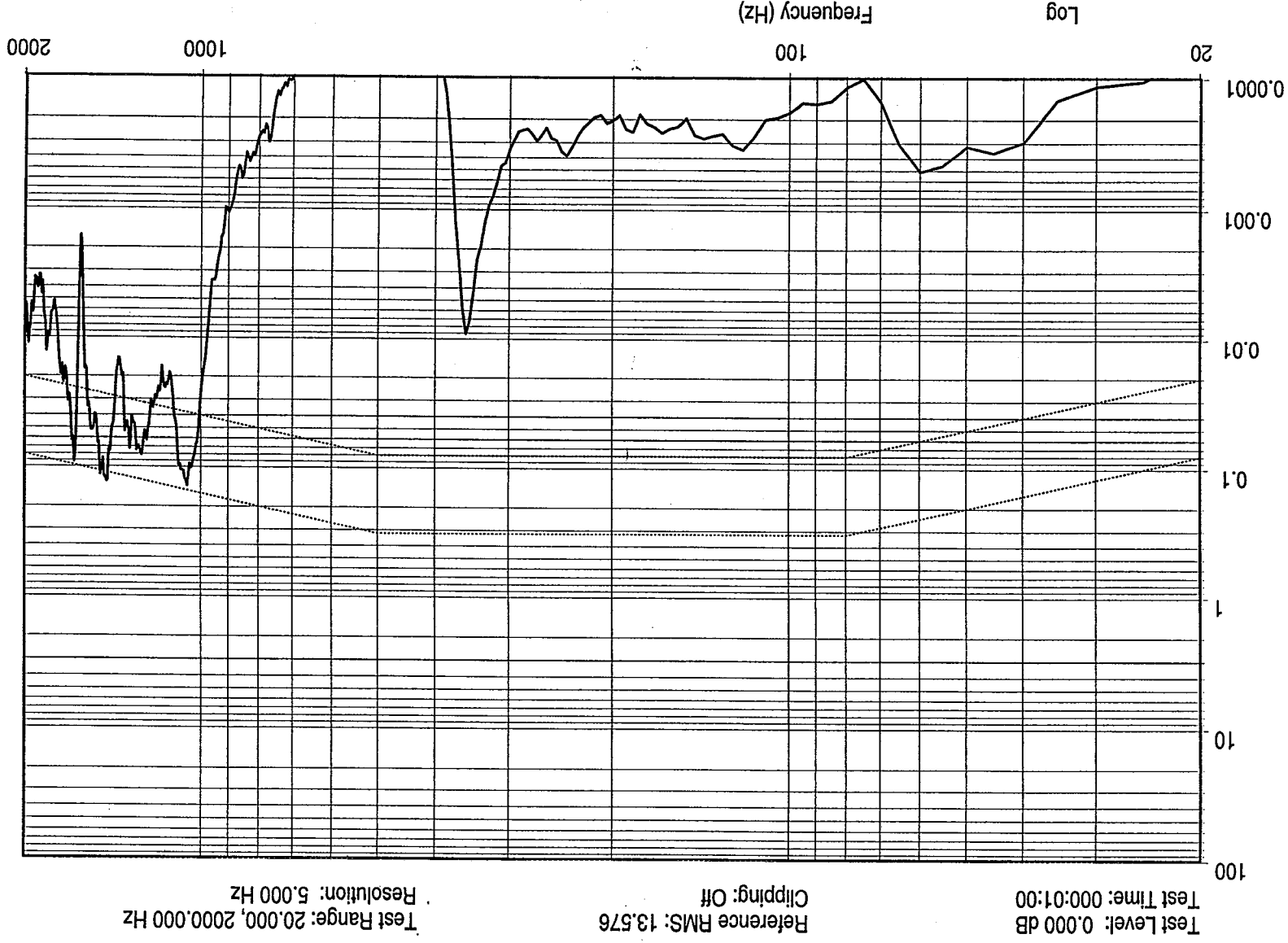
APR 07 1998
ENG 229
7A

16:24:04
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

APR 07 1998
ENG 229
161

UNIT Z AXIS



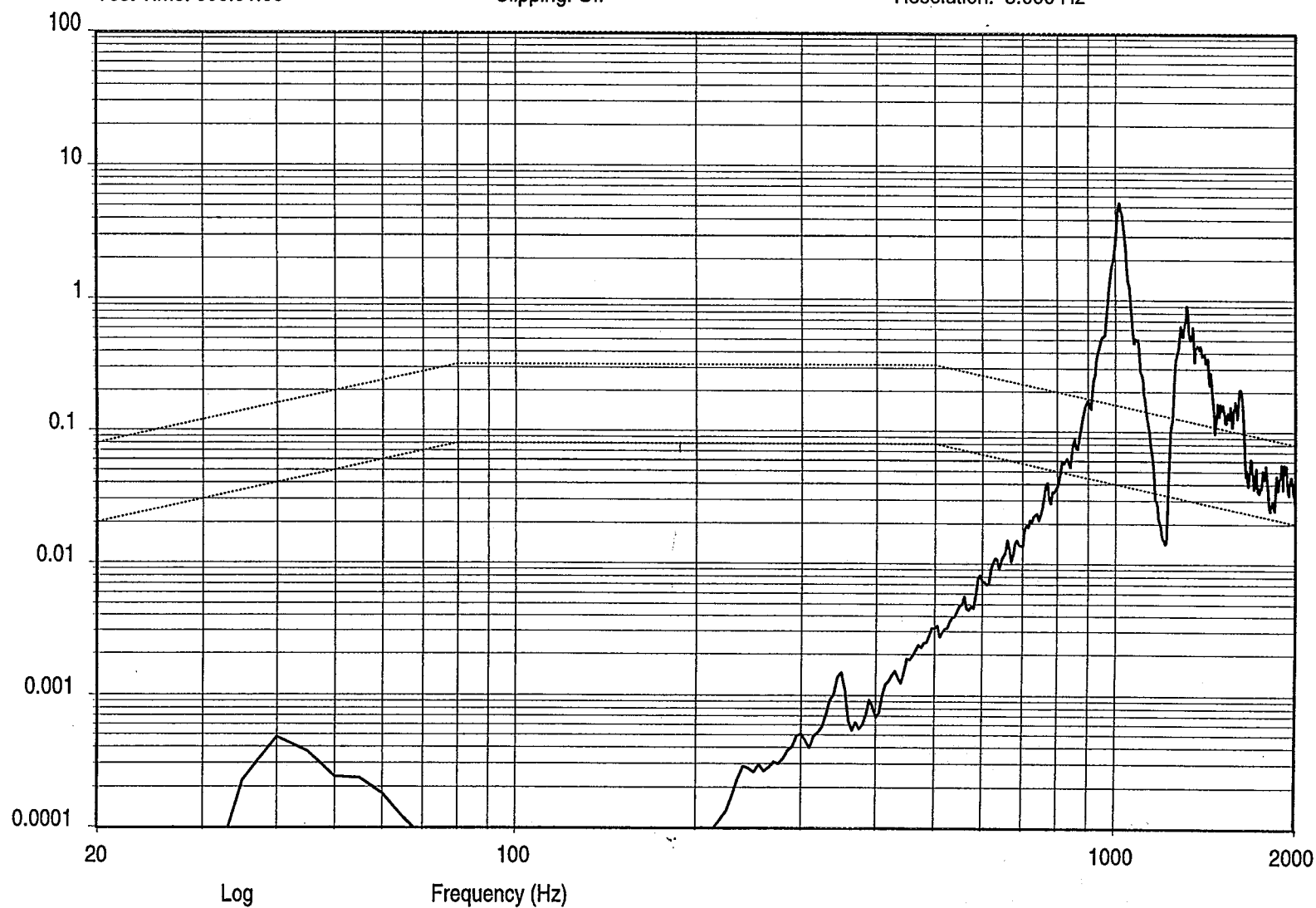
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 3

Log
 g^2/Hz
DOF 120
RMS:
21.257 g



16:24:00
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

APR 07 1998
ENG 229
7A

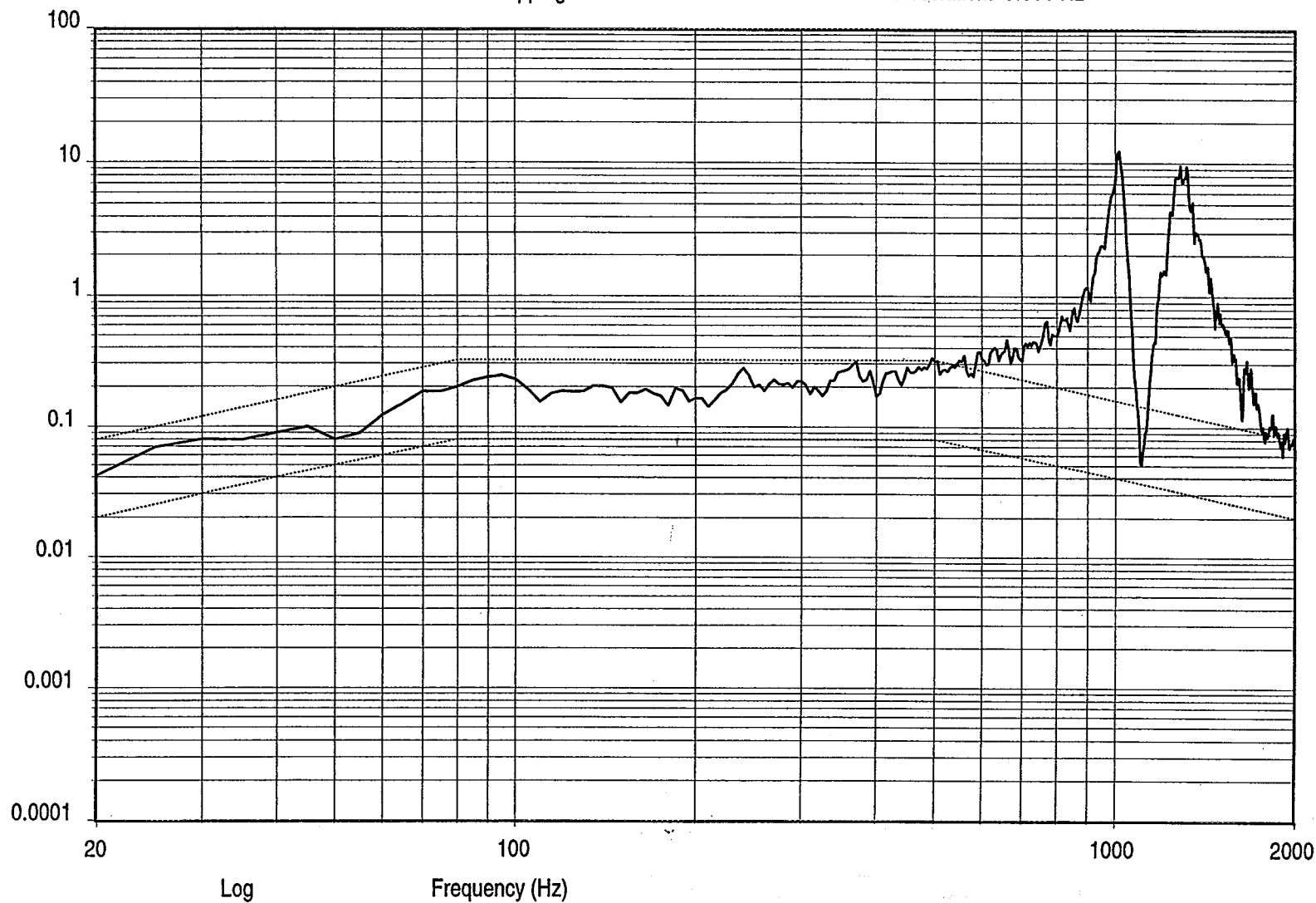
Test Level: 0.000 dB
Test Time: 000:01:00

Reference RMS: 13.576
Clipping: Off

Test Range: 20.000, 2000.000 Hz
Resolution: 5.000 Hz

Auxiliary
Chan. 4

Log
 g^2/Hz
DOF 120
RMS:
47.303 g



16:23:56
07-Apr-1998

AMSU PHASE LOCK OSCILLATOR S/O 431618
Y AXIS TEST S/N F04, P/N 1348360-1 METSAT
Test Name: PLO.tmp

UNIT Y AXIS



Random Version 3.6.0 Test File Listing

File Name: PLO
Current Date: Tue Apr 07 1998 16:18:37

CONTROL PARAMETERS:

DURATION -
Test Time (hhh:mm:ss): 000:01:00
CONTROL STRATEGY -
Degrees of Freedom: 200
Control Spectrum: Average
Output Window: Kaiser-Bessel
OPERATION MODE -
Manual Operation: Enable
EQUALIZATION -
Start Level: -18.0 dB
Initial Test Level: -18.0 dB
Time at Initial Level: Off
Prestored Drive: Off
STARTUP/SHUTDOWN -
Startup Rate: 20.0 dB/sec
Time to Full Level: 60.0 sec
Level Increment: 2.0 dB
Reset Measurement Average: Yes
Shutdown Rate: 20.0 dB/sec

REFERENCE TABLE:

Break Point	Frequency (Hz)	Value (g ² /Hz)	Slope (dB/oct)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1			3	-3	3	-6	6
2	20	0.04					
3	80	0.16					
4	500	0.16					
5	2000	0.04					
6			-3				

TEST BANDWIDTH -

Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz
Frequency Lines: 400.00 Lines
Frequency Resolution: 5.00 Hz

SPECTRUM DYNAMIC LIMITS -

Overall RMS: 13.58 g RMS
Maximum Acceleration (0-pk): 40.73 g
Maximum Velocity (0-pk): 12.86 in/s
Maximum Displacement (0-pk): 0.05 in

IMPORT REFERENCE -

Import: Off

SAFETY PARAMETERS:

ALARM/ABORTS -

RMS Alarm: 21.9 g
RMS Abort: 31.0 g
RMS Abort DOF: 8
Control Signal Loss: Standard

Spectral Lines Allowed Out -

Alarm Lines: 60 Lines
Abort Lines: 100 Lines

Active Conditions -

Minimum Frequency: 20.0 Hz
Maximum Frequency: 2000.0 Hz
Level: -12.0 dB
Enable for Manual Operation: Yes

LOOP CHECK -

Noise Threshold: 100.0 mV RMS
Maximum Drive: 300.0 mV RMS
Pause after Loop Check: No

DRIVE SIGNAL -

Drive Clipping: Off

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	RMS Abscissa (Units)
1	Control	Yes	10.00	Null DC	Acceler	g	0.00		
2	Auxiliary	No	10.00	Null DC	Acceler	g			
3	Auxiliary	No	10.00	Null DC	Acceler	g			
4	Auxiliary	No	10.00	Null DC	Acceler	g			

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	10.00	CONTROL	
2	Auxiliary	No	10.00	UNIT Z AXIS	
3	Auxiliary	No	10.00	UNIT X AXIS	
4	Auxiliary	No	10.00	UNIT Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement: No

H(f) Pair	Response Channel	Reference Channel	Label
1	3	2	3/CONTROL
2	4	2	4/CONTROL
3	5	2	5/CONTROL

DOCUMENTATION

Display Text -

Title 1: AMSU PHASE LOCK OSCILLATOR S/O 431618
 Title 2: Y AXIS TEST S/N F04, P/N 1348360-1 METSAT

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Off

Message Log -

Mode: Off

Printing -

Automatic Plot: Off

LEVEL SCHEDULE:

Enable Level Schedule: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Random Test

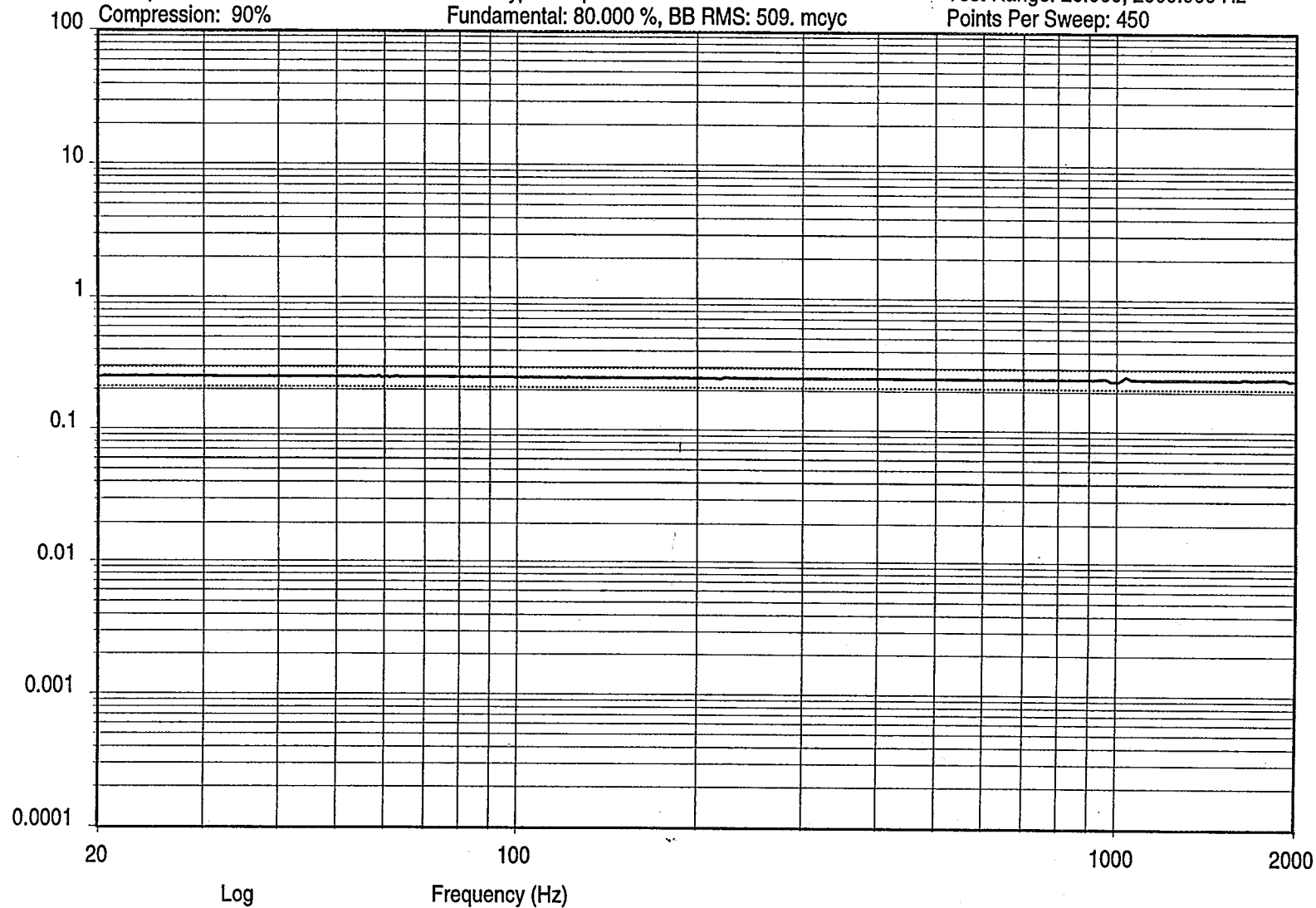
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

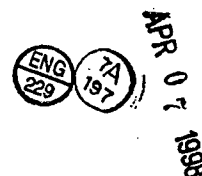
Control

Log
Acceleration
g (0-pk)



16:32:51
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

2

10

1

Log
Acceleration
g (0-pk)

0.1

0.01

0.001

0.0001

20

100

1000

2000

Log

Frequency (Hz)

Z AXIS

16:33:03
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp



APR 07 1998

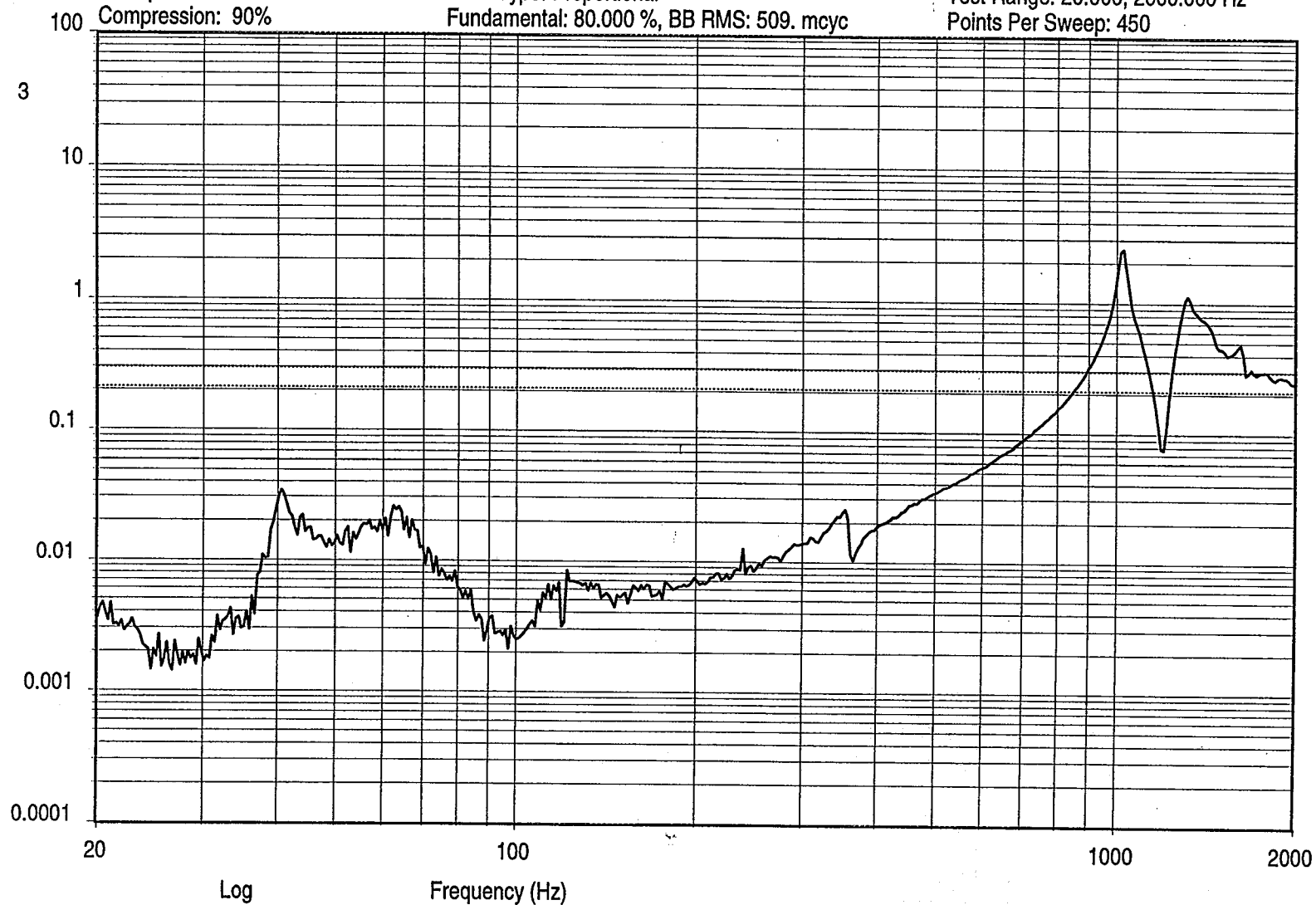
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



16:32:54
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

ENG
229

7A
191

APR 07 1998

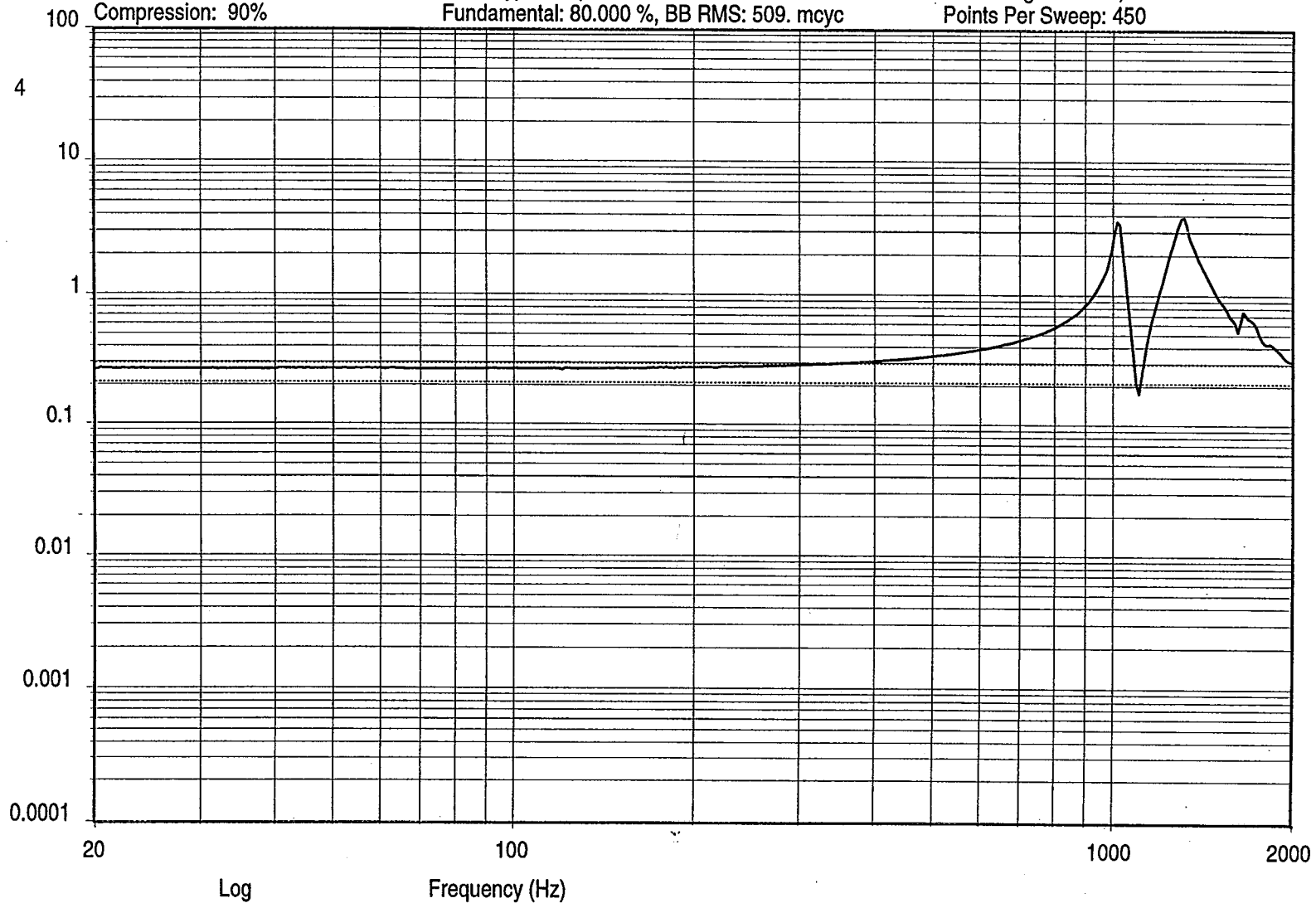
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

Auxiliary
Fundamental

Log
Acceleration
g (0-pk)



16:32:59
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

Y AXIS

ENG
229

TA
197

APR 07 1998

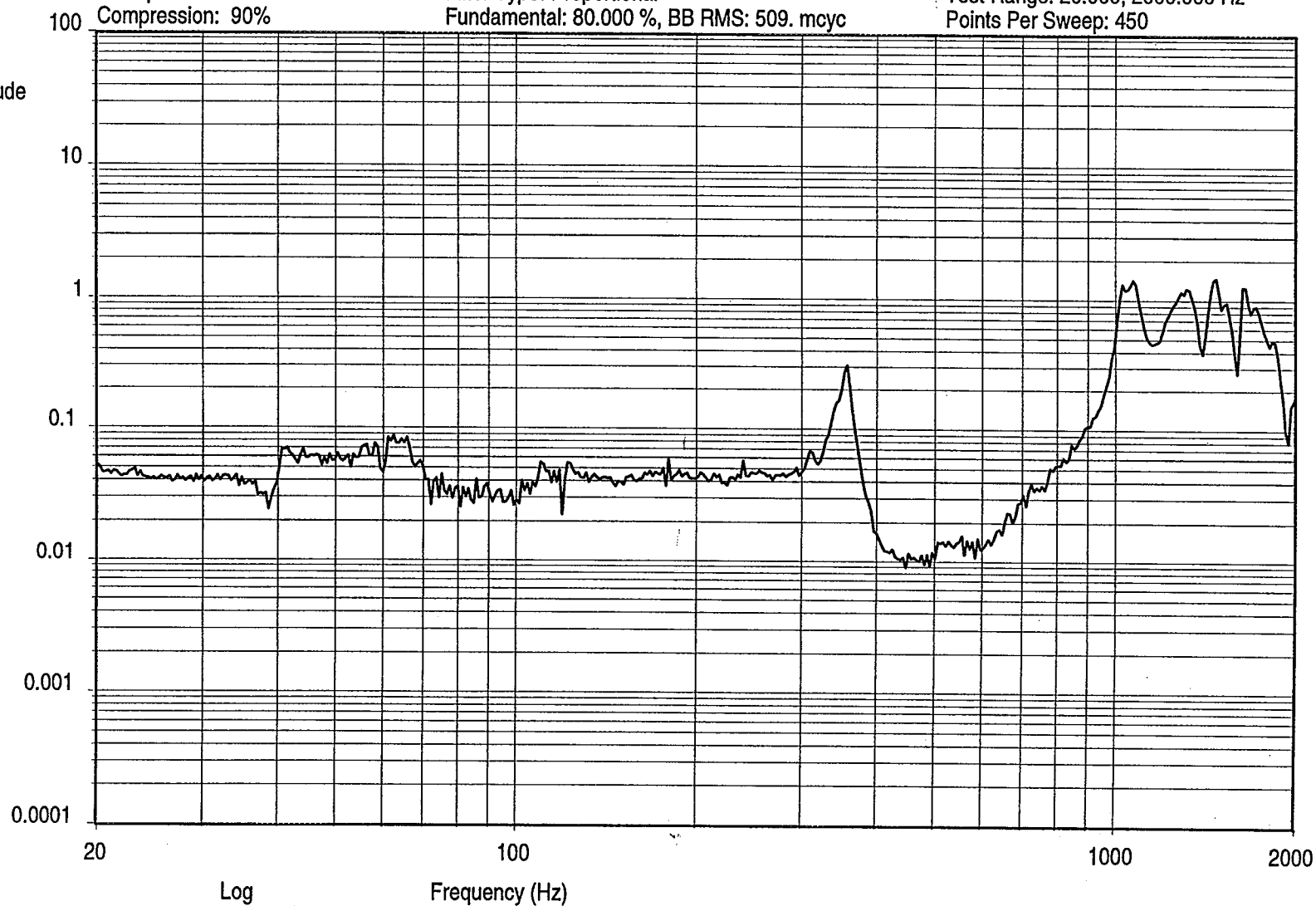
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 2 /Ch 1

Log
Ratio



16:33:17
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

2/CONTROL



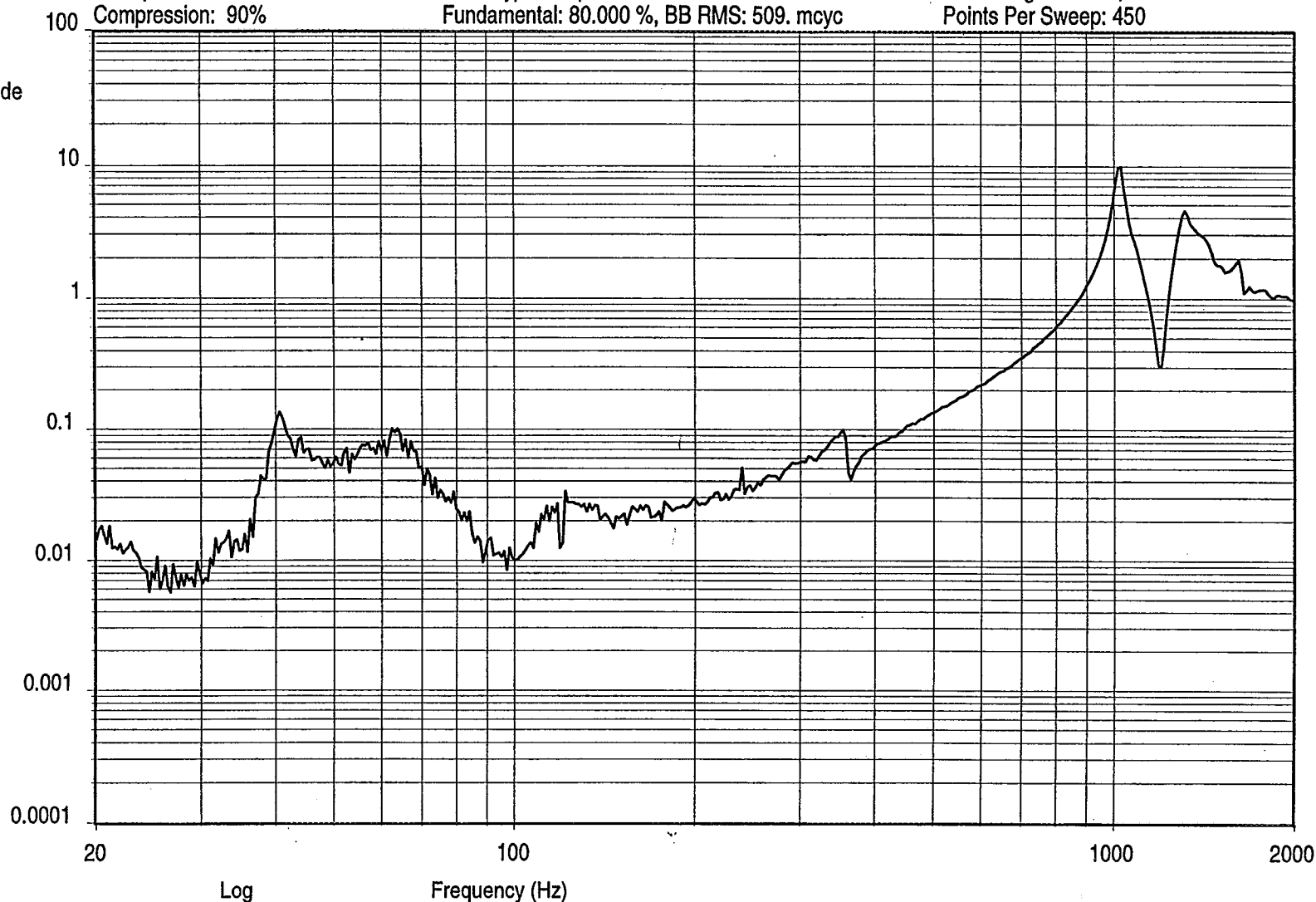
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 3 / Ch 1

Log
Ratio



16:33:21
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

3/CONTROL



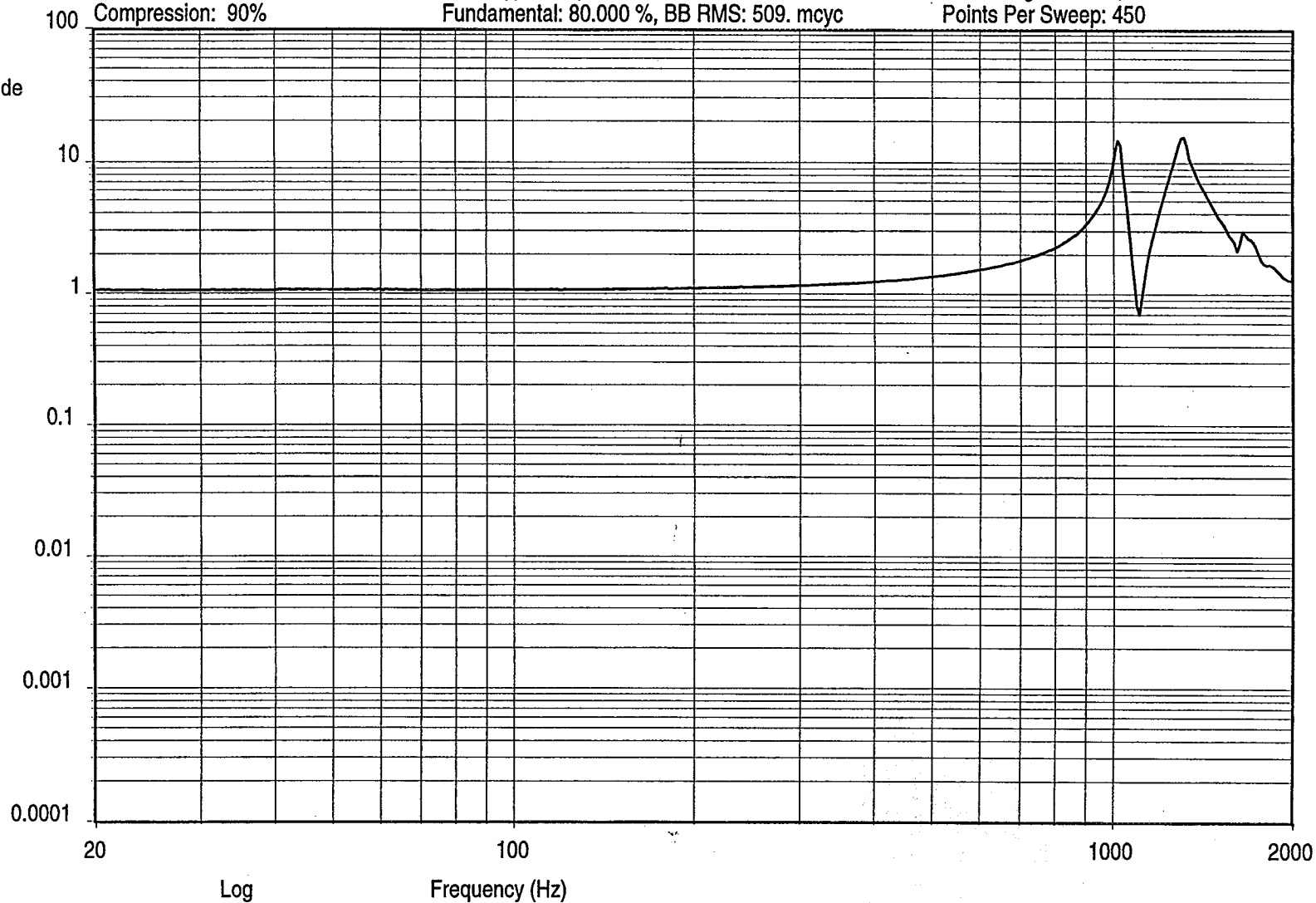
Sweep Number: 1.00
Sweep Rate 1: 2.000 oct/min
Compression: 90%

Elapsed Time: 000:03:19
Filter Type: Proportional
Fundamental: 80.000 %, BB RMS: 509. mcyc

Remaining Time: 000:00:00
Test Range: 20.000, 2000.000 Hz
Points Per Sweep: 450

H(f) Magnitude
Ch 4 / Ch 1

Log
Ratio



16:33:24
07-Apr-1998

AMSU PLO S/O 431618,P/N 1348360-1
POST Y SINE SWEEP S/N F04 METSAT
Sine Test Name: AMSU_A2.tmp

4/ CONTROL



APR 07 1998

Sine Version 4.6.0 Test File Listing

File Name: AMSU_A2
Current Date: Tue Apr 07 1998 16:26:27

CONTROL PARAMETERS:

DURATION -
Type: Sweeps
Sweeps: 1.00
Test Time (hhh:mm:ss): 000:03:19

CONTROL STRATEGY -
Control Spectrum: Average
Filter Type: Proportional
Filter Specification: Fundamental 80.00 %, RMS 509. mcyc

EQUALIZATION -
Test Level: 0.00 dB

OPERATION MODE -
Manual Operation: Enable

STARTUP/SHUTDOWN -
Startup Rate: 10.00 dB/sec
Shutdown Rate: 20.00 dB/sec
Level Increment: 0.10 dB

COMPRESSION PARAMETERS -
Manual Override: Enable
Record Manual Changes: Disable

SWEEP PARAMETERS -
Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 2.0000 Oct/min
Sweep Rate 2: 1.0000 Oct/min
Sweep Rate 3: 0.5000 Oct/min
Sweep Duration (hhh:mm:ss): 000:03:19
Manual Override: Enable
Record Manual Changes: Disable

SWEEP/COMPRESSION TABLE -

Segment Number	Frequency (Hz)	Rate (Oct/min)	Compression (%)
1	2000	2	90

REFERENCE TABLE:

Units for Acceleration, Velocity and Displacement: g, in/s, in

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	2000	Acceleration	0.25	-1.5	1.5	-20	20

REFERENCE PARAMETERS -

Minimum Frequency: 20.000 Hz
Maximum Frequency: 2000.000 Hz
Transducer Crossover: 20.000 Hz
Crossover Range: 10.000 %
Frequency Points: 450.000
Box Tolerance: Disable

IMPORT REFERENCE -

Import: Off

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 0.000 dB
Minimum Acceleration (0-pk): 0.250 g
Maximum Acceleration (0-pk): 0.250 g
Maximum Velocity (0-pk): 0.768 in/s
Maximum Displacement (pk-pk): 0.012 in

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -
Minimum Frequency: 20.00 Hz
Maximum Frequency: 2000.00 Hz

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 5
 LOOP CHECK -
 Noise Threshold: 30.00 mV RMS
 Frequency: 100.00 Hz
 Maximum Drive: 100.00 mV RMS
 Pause after Loop Check: No
 DRIVE SIGNAL --
 Maximum Drive: 10.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measuremen Process
1	Control	Yes	100.00	Nulled	DC Acceler g		0.00		Fundamenta
2	Auxiliary	No	10.00	Nulled	DC Acceler g				Fundamenta
3	Auxiliary	No	10.00	Nulled	DC Acceler g				Fundamenta
4	Auxiliary	No	10.00	Nulled	DC Acceler g				Fundamenta

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	100.00	CONTROL	
2	Auxiliary	No	10.00	Z AXIS	
3	Auxiliary	No	10.00	X AXIS	
4	Auxiliary	No	10.00	Y AXIS	

(12 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	Yes
H(f) Response Reference Label	
Pair Channel Channel	
1 2 1	2/CONTROL
2 3 1	3/CONTROL
3 4 1	4/ CONTROL

DOCUMENTATION:

Display Text -
 Title 1: AMSU PLO S/O 431618,P/N 1348360-1
 Title 2: POST Y SINE SWEEP S/N F04 METSAT
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Off
 Message Log -
 Log Mode: Off
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

Section 3A: Frequency and Power Hysteresis - F03

This section contains data regarding frequency and power hysteresis. In three temperature cycles, the maximum change in frequency was 4 kHz and the maximum change in power of 0.08 dB, both neglectfully small.

AE-26758A
21 Jan 98

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: R. Hail

Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290324	57.290327	57.290331	57.290330	57.290332	57.290334
Output Power 17 to 20 dBm	18.87 dBm	18.90 dBm	18.96 dBm	18.93 dBm	18.57 dBm	18.88 dBm
Frequency 57.290344 GHz ±200 kHz	57.290333	57.290332	57.290336			
Output Power 17 to 20 dBm	18.96 dBm	18.88 dBm	18.93 dBm			

324
333
327
332
331
336

Shop Order No.: 431615

Unit Serial No.: F03

Date: R.T. 4/13/98

Test Engineer: R. Hail

Quality Assurance: (261) 4/17/98

DCMC: E. Kalaczar

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 1

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	23.7°C	15.02 / 520 mA	-15.07 / 66.38 mA
32 ±3	31.6°C	15.02 / 524 mA	-15.07 / 66.99 mA
42 ±3	41.0°C	15.02 / 532 mA	-15.07 / 67.84 mA
52 ±3	52.3°C	15.02 / 528 mA	-15.07 / 69.1 mA
60 ±2 Note 2	58.9°C	15.01 / 534 mA	-15.06 / 69.4 mA
52 ±3	49.0°C	15.02 / 534 mA	-15.05 / 68 mA
42 ±3	42.5°C	15.02 / 533 mA	-15.05 / 67.8 mA
32 ±3	33.30°C	15.02 / 527 mA	-15.05 / 67.1 mA
22 ±2 Notes 1, 3	23.20°C	15.02 / 521 mA	-15.06 / 66.3 mA
12 ±3 (Unit Off)	12.1°C	15.02 / N/A 511 mA	-15.06 / N/A 65.2 mA
2 ±3 (Unit Off)	2.6°C	15.02 / N/A 505 mA	-15.05 / N/A 64.4 mA
-12 ±3 (Unit Off)	-10.8°C	15.03 / N/A 495 mA	-15.07 / N/A 63.02 mA
-22 ±3 (Unit Off)	-20.3°C	15.03 / N/A 488 mA	-15.07 / N/A 61.99 mA
-30 ±2 (Unit Off) Note 2	-28.7°C	15.03 / N/A 479 mA	-15.05 / N/A 61.72 mA
-30 ±2 Note 4	-29.5°C	15.04 / 482 mA	-15.07 / -61.18 mA
-20 ±3	-18.7°C	15.04 / 492 mA	-15.07 / -61.93 mA
-10 ±3	-9.2°C	15.04 / 500 mA	-15.07 / -63.42 mA
0 ±3	.2°C	15.04 / 506 mA	-15.08 / -64.33 mA
10 ±3	9.7°C	15.04 / 512 mA	-15.08 / -65.24 mA
22 ±2 Note 1	21.0°C	15.03 / 519 mA	-15.08 / -66.21 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431615

Unit Serial No.: F03

Date: 4/13/98

Test Engineer: R. Haight

Quality Assurance: 4/17/98

DCMC: 4/20/98

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 2

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	22.9 °C	15.01 / 521 mA	-15.08 / -66.36
32 ±3	32.8 °C	15.01 / 526.3 mA	-15.08 / -67.14
42 ±3	42.2 °C	15.02 / 532 mA	-15.08 / -67.79
52 ±3 <i>Handwritten: 51.7</i>	52.7 °C	15.02 / 528 mA	-15.08 / -69.11
60 ±2 Note 2	58.9 °C	15.02 / 532 mA	-15.07 / -69.54
52 ±3	52.7 °C	15.01 / 530 mA	-15.07 / 69.24
42 ±3	42.00 °C	15.01 / 532 mA	-15.08 / 67.83
32 ±3	32.4 °C	15.01 / 526 mA	-15.08 / 67.15
22 ±2 Notes 1, 3	23.9 °C	15.01 / 521 mA	-15.08 / 66.47
12 ±3 (Unit Off)	12.1 °C	N/A	N/A
2 ±3 (Unit Off)	2.5 °C	N/A	N/A
-12 ±3 (Unit Off)	-12.6 °C	N/A	N/A
-22 ±3 (Unit Off)	-22.3 °C	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.7 °C	N/A	N/A
-30 ±2 Note 4	-30.7 °C	15.04 / 479.3 mA	-15.07 / 61.6 mA
-20 ±3	-20.6 °C	15.04 / 493 mA	-15.08 / 62.4 mA
-10 ±3	-11.1 °C	15.04 / 499 mA	-15.09 / 63.35 mA
0 ±3	-1.7 °C	15.04 / 505 mA	-15.09 / 64.2 mA
10 ±3	9.6 °C	15.03 / 512 mA	-15.09 / 65.3 mA
22 ±2 Note 1	21.2 °C	15.01 / 519 mA	-15.10 / 66.27 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431615
Unit Serial No.: F03
Date: 4.14.98

Test Engineer: G. LAMBERT
Quality Assurance: (Signature) 4/15/98
DCMC: (Signature) Galazac

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 3

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	21.7°C	15.02V/520mA	-15.10V/-66.3mA
32 ±3	31.2°C	15.02/525mA	-15.09/-67.10mA
42 ±3	40.6°C	15.01/531mA	-15.09/-67.84mA
52 ±3	52.0°C	14.98/528mA	-15.08/-69.25mA
60 ±2 Note 2	60.7°C	14.97/533mA	-15.09/-69.7mA
52 ±3	52.0°C	14.97/529mA	-15.09/-69.17mA
42 ±3	42.6°C	15.03/533mA	-15.09/-67.90mA
32 ±3	30.8°C	15.03/525mA	-15.09/-66.96mA
22 ±2 Notes 1, 3	22.5°C	15.03/521mA	-15.09/66.40mA
12 ±3 (Unit Off)	13.2°C	N/A	N/A
2 ±3 (Unit Off)	2.3°C	N/A	N/A
-12 ±3 (Unit Off)	-12.7°C	N/A	N/A
-22 ±3 (Unit Off)	-22.6°C	N/A	N/A
-30 ±2 (Unit Off) Note 2	-28.9°C	N/A	N/A
-30 ±2 Note 4	-29.7°C	15.04/480mA	-15.08/61.82mA
-20 ±3	-21.0°C	15.04/490mA	-15.08/62.25mA
-10 ±3	-11.5°C	15.04/498mA	-15.10/63.33mA
0 ±3	-0.2°C	15.04/506mA	-15.09/64.4mA
10 ±3	9.2°C	15.03/512mA	-15.08/65.37mA
22 ±2 Note 1	22.3°C	15.03/520mA	-15.09/66.40mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431615
Unit Serial No.: F03
Date: 4/15/98

Test Engineer: M. Goldman
Quality Assurance: 4-17-98
DCMC: C. Salazar

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 4

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	22.7°C	15.01 / 520ma	-15.11 / 66.41ma
32 ±3	31.9°C	15.01 / 525ma	-15.11 / 67.16ma
42 ±3	41.3°C	15.02 / 531ma	-15.11 / 67.80ma
52 ±3	50.7°C	15.03 / 528ma	-15.11 / 69.21ma
60 ±2 Note 2	59.0°C	15.01 / 532ma	-15.11 / 69.64ma
52 ±3	N/A	N/A	N/A
42 ±3	N/A	N/A	N/A
32 ±3	N/A	N/A	N/A
22 ±2 Notes 1, 3	N/A	N/A	N/A
12 ±3 (Unit Off)	N/A	N/A	N/A
2 ±3 (Unit Off)	N/A	N/A	N/A
-12 ±3 (Unit Off)	N/A	N/A	N/A
-22 ±3 (Unit Off)	N/A	N/A	N/A
-30 ±2 (Unit Off) Note 2	N/A	N/A	N/A
-30 ±2 Note 4	-30.7°C	15.04 / 481mA	-15.09 / 61.69mA
-20 ±3	-19.4°C	15.04 / 494mA	-15.11 / 62.48mA
-10 ±3	-9.5°C	15.04 / 500mA	-15.10 / 63.52mA
0 ±3	-0.30°C	15.04 / 506mA	-15.10 / 64.43mA
10 ±3	10.70°C	15.03 / 513mA	-15.10 / 65.39mA
22 ±2 Note 1	22.1°C	15.03 / 520mA	-15.1 / 66.41mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

EXP-101618
#08

Shop Order No.: 431615

Unit Serial No.: F03

Date: 4/15/98

Test Engineer: R. Hayl

Quality Assurance: 7A 190 APR 20 98

DCMC: 4-20-98

21 Jan 93

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE #

5

4.17.98

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	22.1°C	15.03 / 520 mA	-15.1 / 66.41 mA
32 ±3	32.8°C	15.02 / 527 mA	-15.11 / 67.30 mA
42 ±3	42.2°C	15.03 / 533 mA	-15.12 / 68.04 mA
52 ±3	51.6°C	15.03 / 528 mA	-15.12 / 69.21 mA
60 ±2 Note 2	59.8°C	15.01 / 532 mA	-15.11 / 69.68 mA
52 ±3	N/A	N/A	N/A
42 ±3			
32 ±3			
22 ±2 Notes 1, 3			
12 ±3 (Unit Off)		N/A	N/A
2 ±3 (Unit Off)		N/A	N/A
-12 ±3 (Unit Off)		N/A	N/A
-22 ±3 (Unit Off)	N/A	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.0°C	N/A	N/A
-30 ±2 Note 4	-28.1°C	15.04 / 488 mA	-15.13 / 61.7 mA
-20 ±3	-21.5°C	15.05 / 492 mA	-15.13 / 62.3 mA
-10 ±3	-12.0°C	15.05 / 499 mA	-15.13 / 63.3 mA
0 ±3	-7.5°C	15.04 / 505 mA	-15.11 / 64.98 mA
10 ±3	10.7°C	15.03 / 513 mA	-15.11 / 65.46 mA
22 ±2 Note 1 t luna	20.1°C	15.03 / 519 mA	-15.12 / 66.3 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

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A08

Shop Order No.: 431615

Test Engineer: MR. Yarbrough

Unit Serial No.: F03

Quality Assurance: TA 190

Date: 4/16/98

DCMC: H-20-98

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 5 SHT 2 OF 2 4.17.98 280

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	CONT. FROM SHT 1 OF 2		
32 ±3	31.5°C	15.03/526mA	-15.12/-67.2mA
42 ±3	42.9°C	15.02/532mA	-15.12/-67.94mA
52 ±3	52.3°C	15.01/528mA	-15.11/-69.23mA
60 ±2 Note 2	59.4°C	15.02/532mA	-15.11/-69.73mA
52 ±3	N/A	N/A	N/A
42 ±3			
32 ±3			
22 ±2 Notes 1, 3	N/A	N/A	N/A
12 ±3 (Unit Off)		N/A	N/A
2 ±3 (Unit Off)		N/A	N/A
-12 ±3 (Unit Off)		N/A	N/A
-22 ±3 (Unit Off)	N/A	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.3°C	N/A	N/A
-30 ±2 Note 4	-29.6°C	15.04/480mA	-15.11/-61.8mA
-20 ±3	-21.3°C	15.04/492mA	-15.12/-62.4mA
-10 ±3	-11.8°C	15.04/498mA	-15.11/-63.3mA
0 ±3	-0.5°C	15.04/506mA	-15.11/-64.5mA
10 ±3	9.0°C	15.04/512mA	-15.11/-65.3mA
22 ±2 Note 1	22.2°C	15.03/520mA	-15.12/-66.5mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431615

Unit Serial No.: F03

Date: 4/17/98

Test Engineer: [Signature]

Quality Assurance: [Signature]

DCMC: 4-20-98

TEST DATA SHEET 7 (Sheet 3 of 3)
Temperature Cycling (Paragraph 4.2.2)

Step No.	Time	Date	TC#1
1.	6:30 PM	4/12/98	-23.9°C
2.	7:00 PM	"	"
3.	8:20 PM	"	58.9°C
4.	0:20	4/14/98	60.500°C
5.	2:40 AM	4/14/98	23.200
6.	3:25 AM	4/14/98	21.3°C
7.	5:20 AM	4/14/98	-29.6°C
8.	9:25 AM	4/14/98	-29.5°C
9.	11:20 AM	4/14/98	+21.0°C
10.	11:30 PM	4/14/98	60.5°C 22.4°C T.D.
11.	5:25 PM	4/14/98	60.3°C 59.0°C
12.	5:30 PM	4/14/98	60.4°C
13.	7:10 PM	4/14/98	-23.9°C
14.	7:40 PM	4/14/98	23.9°C
15.	9:40 PM	4/14/98	-29.7°C
16.	1:45 AM	4/15/98	-31.0°C
17.	4:10 AM	4/15/98	21.7°C
18.	4:15 AM	4/15/98	21.7°C
19.	5:45 AM	4/15/98	61.5°C
20.	9:45 AM	4/15/98	60.3°C
21.	12:50 PM	4/15/98	22.5°C
22.	4:00 PM	4/15/98	-28.9°C
23.	8:00 PM	4/15/98	-29.7°C
24.	9:55 PM	4/15/98	22.3°C
25.	10:25 PM	4/15/98	22.7°C
26.	12:00 AM	4/16/98	59.0°C
27.	00:00	4/16/98	60.1°C
28.	04:00	4/16/98	60.3°C
29.	0720	4/16/98	-29.9°C
30.	1120 AM	4/16/98	-30.7°C
31.	4:05 PM	4/16/98	59.7°C
32.	8:10 PM	4/16/98	60.3°C
33.	11:25 PM	4/16/98	-29.0°C
34.	3:25 AM	4/17/98	-29.0°C
35.	6:35 AM	4/17/98	59.4°C
36.	10:38 AM	4/17/98	60.3°C
37.	2:05 PM	4/17/98	-29.3°C
38.	6:10 PM	4/17/98	-29.6°C
39.	8:08 PM	4/17/98	+23.2°C
40.	8:20 PM	4/17/98	22.7°C

* Accidentally Tripped Circuit Breaker at 12:15 AM on 4/14/98. Temp on TCI was 50°C. NO PROBLEMS. M. Brown - 4/14/98.

FO3 CHAMBER, Temp on TCI was 50°C. NO PROBLEMS. M. Brown - 4/14/98.

EOCR 101618
#09

Top Order No.: 431615

Unit Serial No.: FO3

Date: 4/13/98

Test Engineer: M. Hay

Quality Assurance: 4/20/98

DCMC: 4/20/98

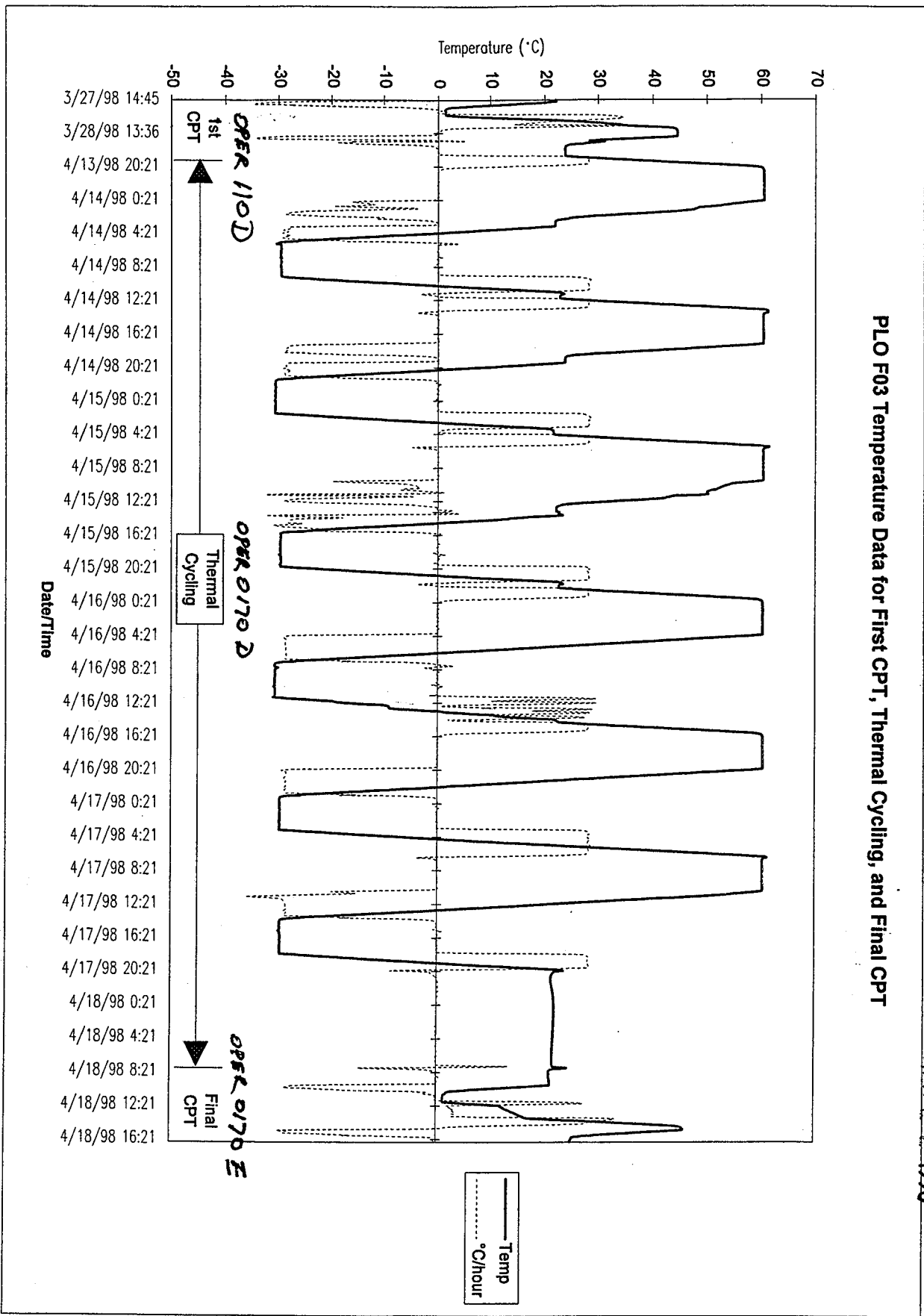
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APR 22 1998

Done
4/22/98

PLO F03 Temperature Data for First CPT, Thermal Cycling, and Final CPT



F03

DAT35

F04

Baseplate

Baseplate

Date/Time	Temp	°C/hour
3/27/98 14:45	22.115	0.425
3/27/98 14:49	22.087	-4.76
3/27/98 14:53	22.08	-12.48
3/28/98 9:48	22.2	-23.29
3/28/98 9:52	21.135	-29.01
3/28/98 9:56	19.584	-32.575
3/28/98 10:00	17.542	-33.68
3/28/98 10:04	15.333	-34.336
3/28/98 10:08	13.069	-34.7885
3/28/98 10:12	10.806	-27.0155
3/28/98 10:16	8.4658	-27.7495
3/28/98 10:20	6.1113	-19.7105
3/28/98 10:24	5.4029	-18.058
3/28/98 10:28	2.9159	-6.677
3/28/98 10:32	2.1692	-3.5305
3/28/98 10:36	1.7913	-1.9195
3/28/98 10:40	1.5805	-1.085
3/28/98 10:44	1.4631	0.273
3/28/98 10:48	1.4074	0.4905
3/28/98 10:52	1.3635	0.7565
3/28/98 10:56	1.5177	-0.0075
3/28/98 11:00	1.5055	-0.0245
3/28/98 11:04	1.5148	-0.195
3/28/98 11:08	1.5162	0.0975
3/28/98 11:12	1.5006	0.132
3/28/98 11:16	1.4758	5.391
3/28/98 11:20	1.5357	14.479
3/28/98 11:24	1.527	24.905
3/28/98 11:28	2.554	30.7915
3/28/98 11:32	4.4315	32.8275
3/28/98 11:36	6.508	33.77
3/28/98 11:40	8.7123	34.3285
3/28/98 11:44	10.997	34.515
3/28/98 11:48	13.262	34.695
3/28/98 11:52	15.578	33.77
3/28/98 11:56	17.9	31.855
3/28/98 12:00	20.201	29.205
3/28/98 12:04	22.332	26.74
3/28/98 12:08	24.271	24.515
3/28/98 12:12	26.042	22.465
3/28/98 12:16	27.68	20.265
3/28/98 12:20	29.174	18.49
3/28/98 12:24	30.535	16.98
3/28/98 12:28	31.733	15.615
3/28/98 12:32	32.872	14.375
3/28/98 12:36	33.931	16.58
3/28/98 12:40	34.856	28.97
3/28/98 12:44	35.747	35.325

Date/Time	Temp	°C/hour
3/26/98 14:06	26.644	12.135
3/26/98 14:10	27.729	2.08
3/26/98 14:14	28.747	-16.795
3/26/98 14:18	29.071	-26.07
3/26/98 14:22	28.145	-23.715
3/26/98 14:26	25.388	-10.31
3/26/98 14:30	23.857	-3.975
3/26/98 14:34	23.402	-2.905
3/26/98 14:35	23.326	-4.1
3/26/98 14:39	23.062	-3.2
3/26/98 14:43	22.821	-2.14
3/26/98 14:47	22.506	-0.735
3/26/98 14:51	22.422	-0.555
3/26/98 14:55	22.393	-0.39
3/26/98 14:59	22.359	-0.345
3/26/98 15:03	22.311	-0.08
3/26/98 15:07	22.315	-0.08
3/26/98 15:11	22.29	0.025
3/26/98 15:15	22.295	-0.11
3/26/98 15:19	22.299	-0.12
3/26/98 15:23	22.295	-0.245
3/26/98 15:27	22.273	-0.09
3/26/98 15:31	22.275	-0.08
3/26/98 15:35	22.246	0.085
3/26/98 15:39	22.255	0.075
3/26/98 15:43	22.259	-0.1
3/26/98 15:47	22.263	0.09
3/26/98 15:51	22.27	-0.055
3/26/98 15:55	22.239	0.07
3/26/98 15:59	22.281	-0.33
3/26/98 16:03	22.259	-0.435
3/26/98 16:07	22.253	4.55
3/26/98 16:11	22.215	3.32
3/27/98 8:59	22.172	-15.19
3/27/98 9:03	23.163	-31.54
3/27/98 9:07	22.879	-38.3
3/27/98 9:11	19.134	-29.33
3/27/98 9:15	16.855	-28.705
3/27/98 9:19	15.219	-31.804
3/27/98 9:23	13.268	-33.8435
3/27/98 9:27	11.114	-29.748
3/27/98 9:31	8.8582	-27.362
3/27/98 9:35	6.4993	-19.56
3/27/98 9:39	5.1644	-14.504
3/27/98 9:43	3.3858	-6.6
3/27/98 9:47	2.5873	-3.1965
3/27/98 9:51	2.2636	-1.8455
3/27/98 9:55	2.0658	-1.2755

DAT35

3/28/98 12:48	37.247	32.175	3/27/98 9:59	1.948	-1.002
3/28/98 12:52	40.65	17.105	3/27/98 10:03	1.8945	-0.857
3/28/98 12:56	42.812	7.45	3/27/98 10:07	1.8107	-0.55
3/28/98 13:00	43.682	3.67	3/27/98 10:11	1.7476	-1.2175
3/28/98 13:04	44.071	1.94	3/27/98 10:15	1.7231	-1.796
3/28/98 13:08	44.302	1.025	3/27/98 10:19	1.7007	-1.6635
3/28/98 13:12	44.416	0.635	3/27/98 10:23	1.5041	-0.472
3/28/98 13:16	44.459	0.62	3/27/98 10:27	1.3639	0.7065
3/28/98 13:20	44.507	0.4	3/27/98 10:31	1.368	0.9605
3/28/98 13:24	44.543	0.22	3/27/98 10:35	1.4097	1.096
3/28/98 13:28	44.583	-0.26	3/27/98 10:39	1.5052	0.4685
3/28/98 13:32	44.587	-0.385	3/27/98 10:43	1.5601	0.401
3/28/98 13:36	44.587	-0.315	3/27/98 10:47	1.6289	0.039
3/28/98 13:40	44.531	-0.055	3/27/98 10:51	1.5989	0.696
3/28/98 13:44	44.51	0.07	3/27/98 10:55	1.6403	6.0215
3/28/98 13:48	44.524	-0.675	3/27/98 10:59	1.6367	14.683
3/28/98 13:52	44.52	-8.735	3/27/98 11:03	1.7381	24.479
3/28/98 13:56	44.524	-18.99	3/27/98 11:07	2.8446	29.7405
3/28/98 14:00	44.389	-28.93	3/27/98 11:11	4.5733	32.3685
3/28/98 14:04	42.773	-32.095	3/27/98 11:15	6.6339	33.3405
3/28/98 14:08	40.726	-33.405	3/27/98 11:19	8.7927	33.9565
3/28/98 14:12	38.603	-34.385	3/27/98 11:23	11.047	34.185
3/28/98 14:16	36.354	-34.01	3/27/98 11:27	13.302	34.435
3/28/98 14:20	34.045	-28.43	3/27/98 11:31	15.584	34.65
3/28/98 14:24	31.726	-2.25	3/27/98 11:35	17.884	34.885
3/28/98 14:28	29.552	4.36	3/27/98 11:39	20.189	35.015
3/28/98 14:32	28.359	5.45	3/27/98 11:43	22.514	35.225
4/13/98 17:21	31.276	-16.195	3/27/98 11:47	24.861	35.045
4/13/98 17:25	30.424	-15.57	3/27/98 11:51	27.192	35.22
4/13/98 17:29	29.449	-19.005	3/27/98 11:55	29.559	34.985
4/13/98 17:33	28.037	-16.73	3/27/98 11:59	31.87	34.935
4/13/98 17:37	27.31	-15.095	3/27/98 12:03	34.236	34.18
4/13/98 17:41	25.648	-7.885	3/27/98 12:07	36.556	32.42
4/13/98 17:45	24.691	-3.67	3/27/98 12:11	38.857	26.27
4/13/98 17:49	24.291	-1.8	3/27/98 12:15	41.072	18.01
4/13/98 17:53	24.071	-0.815	3/27/98 12:19	43.04	9.72
4/13/98 17:57	23.957	-0.465	3/27/98 12:23	44.111	5.23
4/13/98 18:01	23.931	-0.47	3/27/98 12:27	44.674	2.985
4/13/98 18:05	23.908	-0.41	3/27/98 12:31	44.984	1.775
4/13/98 18:09	23.864	-0.12	3/27/98 12:35	45.157	0.525
4/13/98 18:13	23.837	0.045	3/27/98 12:39	45.271	-0.32
4/13/98 18:17	23.826	0.15	3/27/98 12:43	45.339	-1.225
4/13/98 18:21	23.84	0.23	3/27/98 12:47	45.262	-1.395
4/13/98 18:25	23.846	0.14	3/27/98 12:51	45.207	-1.325
4/13/98 18:29	23.856	0.035	3/27/98 12:55	45.094	-0.96
4/13/98 18:33	23.886	-0.07	3/27/98 12:59	44.983	-6.59
4/13/98 18:37	23.874	0.055	3/27/98 13:03	44.942	-17.95
4/13/98 18:41	23.863	0.205	3/27/98 13:07	44.902	-31.42
4/13/98 18:45	23.872	-0.015	3/27/98 13:11	43.665	-39.24

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4/13/98 18:49	23.885	-0.035	3/27/98 13:15	41.352	-40.36
4/13/98 18:53	23.904	0.04	3/27/98 13:19	38.618	-38.52
4/13/98 18:57	23.869	4.67	3/27/98 13:23	35.817	-31.7
4/13/98 19:01	23.878	12.015	3/27/98 13:27	33.28	-28.56
4/13/98 19:05	23.912	20.38	3/27/98 13:31	30.914	-33.315
4/13/98 19:09	24.803	24.79	3/27/98 13:35	29.477	20.3
4/13/98 19:13	26.281	26.57	3/27/98 13:39	27.568	22.14
4/13/98 19:17	27.988	27.47	3/27/98 13:43	24.251	33.97
4/13/98 19:21	29.761	27.925	4/13/98 17:21	33.537	-19.705
4/13/98 19:25	31.595	28.22	4/13/98 17:25	31.996	-20.45
4/13/98 19:29	33.482	28.2	4/13/98 17:29	31.045	-19.05
4/13/98 19:33	35.346	28.275	4/13/98 17:33	29.596	-20.705
4/13/98 19:37	37.239	28.27	4/13/98 17:37	27.906	-15.49
4/13/98 19:41	39.122	28.3	4/13/98 17:41	27.235	-14.265
4/13/98 19:45	41.001	28.315	4/13/98 17:45	25.455	-6.355
4/13/98 19:49	42.893	28.31	4/13/98 17:49	24.808	-3.765
4/13/98 19:53	44.782	28.285	4/13/98 17:53	24.382	-2.16
4/13/98 19:57	46.664	28.285	4/13/98 17:57	24.184	-1.285
4/13/98 20:01	48.555	28.205	4/13/98 18:01	24.055	-0.88
4/13/98 20:05	50.439	28.01	4/13/98 18:05	23.95	-0.205
4/13/98 20:09	52.321	25.875	4/13/98 18:09	23.927	-0.125
4/13/98 20:13	54.196	23.66	4/13/98 18:13	23.879	0.04
4/13/98 20:17	56.041	17.915	4/13/98 18:17	23.909	-0.06
4/13/98 20:21	57.496	12.365	4/13/98 18:21	23.902	-0.08
4/13/98 20:25	58.928	6.345	4/13/98 18:25	23.887	0.04
4/13/98 20:29	59.624	3.33	4/13/98 18:29	23.897	0.035
4/13/98 20:33	59.969	1.8	4/13/98 18:33	23.886	0.035
4/13/98 20:37	60.197	0.875	4/13/98 18:37	23.895	0.055
4/13/98 20:41	60.29	0.5	4/13/98 18:41	23.904	0.1
4/13/98 20:45	60.329	0.495	4/13/98 18:45	23.893	0.19
4/13/98 20:49	60.372	0.14	4/13/98 18:49	23.906	-0.14
4/13/98 20:53	60.39	0.115	4/13/98 18:53	23.924	-0.575
4/13/98 20:57	60.428	0.005	4/13/98 18:57	23.931	3.635
4/13/98 21:01	60.4	0.03	4/13/98 19:01	23.878	10.57
4/13/98 21:05	60.413	0.045	4/13/98 19:05	23.809	18.94
4/13/98 21:09	60.429	-0.03	4/13/98 19:09	24.658	23.565
4/13/98 21:13	60.406	0.065	4/13/98 19:13	25.992	26.075
4/13/98 21:17	60.422	0.085	4/13/98 19:17	27.597	27.19
4/13/98 21:21	60.423	0.08	4/13/98 19:21	29.371	27.645
4/13/98 21:25	60.419	0.1	4/13/98 19:25	31.207	27.84
4/13/98 21:29	60.439	-0.1	4/13/98 19:29	33.035	28.12
4/13/98 21:33	60.439	0	4/13/98 19:33	34.9	28.3
4/13/98 21:37	60.439	0.015	4/13/98 19:37	36.775	28.395
4/13/98 21:41	60.419	0.115	4/13/98 19:41	38.659	28.325
4/13/98 21:45	60.439	0.015	4/13/98 19:45	40.56	28.24
4/13/98 21:49	60.442	0.125	4/13/98 19:49	42.454	28.33
4/13/98 21:53	60.442	-0.075	4/13/98 19:53	44.324	28.41
4/13/98 21:57	60.442	0.015	4/13/98 19:57	46.208	28.505
4/13/98 22:01	60.467	-0.015	4/13/98 20:01	48.12	28.525

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4/13/98 22:05	60.427	0.205	4/13/98 20:05	50.006	28.62
4/13/98 22:09	60.445	0.01	4/13/98 20:09	51.909	26.675
4/13/98 22:13	60.464	-0.07	4/13/98 20:13	53.825	24.74
4/13/98 22:17	60.468	0.035	4/13/98 20:17	55.73	18.89
4/13/98 22:21	60.447	0.14	4/13/98 20:21	57.244	13.625
4/13/98 22:25	60.45	0.105	4/13/98 20:25	58.773	7.12
4/13/98 22:29	60.475	-0.025	4/13/98 20:29	59.508	4.2
4/13/98 22:33	60.475	-0.12	4/13/98 20:33	59.969	2.38
4/13/98 22:37	60.471	-0.095	4/13/98 20:37	60.197	1.455
4/13/98 22:41	60.47	0.095	4/13/98 20:41	60.348	0.79
4/13/98 22:45	60.451	0.105	4/13/98 20:45	60.445	0.59
4/13/98 22:49	60.452	0.115	4/13/98 20:49	60.488	0.43
4/13/98 22:53	60.489	-0.17	4/13/98 20:53	60.506	0.4
4/13/98 22:57	60.472	-0.165	4/13/98 20:57	60.563	0.1
4/13/98 23:01	60.475	-0.085	4/13/98 21:01	60.574	0.03
4/13/98 23:05	60.455	0.03	4/13/98 21:05	60.586	0.145
4/13/98 23:09	60.439	0.015	4/13/98 21:09	60.583	0.065
4/13/98 23:13	60.458	0.11	4/13/98 21:13	60.58	0.16
4/13/98 23:17	60.461	-0.1	4/13/98 21:17	60.615	-0.015
4/13/98 23:21	60.442	0.095	4/13/98 21:21	60.596	-0.015
4/13/98 23:25	60.48	-0.115	4/13/98 21:25	60.612	0.005
4/13/98 23:29	60.441	0.175	4/13/98 21:29	60.612	0.005
4/13/98 23:33	60.461	0.095	4/13/98 21:33	60.593	0.1
4/13/98 23:37	60.457	0.055	4/13/98 21:37	60.613	0.115
4/13/98 23:41	60.476	-0.04	4/13/98 21:41	60.613	0.115
4/13/98 23:45	60.48	-0.105	4/13/98 21:45	60.613	0.115
4/13/98 23:49	60.468	0.125	4/13/98 21:49	60.636	-0.075
4/13/98 23:53	60.468	0.175	4/13/98 21:53	60.636	0.015
4/13/98 23:57	60.459	0.16	4/13/98 21:57	60.636	0.11
4/14/98 0:01	60.493	-0.085	4/13/98 22:01	60.621	0.085
4/14/98 0:05	60.503	-0.12	4/13/98 22:05	60.639	0.11
4/14/98 0:09	60.491	-0.04	4/13/98 22:09	60.658	-0.09
4/14/98 0:13	60.476	-0.045	4/13/98 22:13	60.638	0.215
4/14/98 0:17	60.479	-0.025	4/13/98 22:17	60.661	0.035
4/14/98 0:21	60.483	-2.64	4/13/98 22:21	60.64	0.235
4/14/98 0:25	60.467	-7.955	4/13/98 22:25	60.681	-0.185
4/14/98 0:29	60.474	-13.395	4/13/98 22:29	60.668	0.075
4/14/98 0:33	59.955	-15.965	4/13/98 22:33	60.687	-0.215
4/14/98 0:37	58.876	-15.235	4/13/98 22:37	60.644	0.195
4/14/98 0:41	57.795	-13.86	4/13/98 22:41	60.683	-0.005
4/14/98 0:45	56.762	-12.64	4/13/98 22:45	60.644	0.105
4/14/98 0:49	55.829	-12.35	4/13/98 22:49	60.683	-0.075
4/14/98 0:53	55.023	-11.735	4/13/98 22:53	60.682	0.025
4/14/98 0:57	54.234	-14.05	4/13/98 22:57	60.665	-0.07
4/14/98 1:01	53.359	-14.97	4/13/98 23:01	60.668	-0.085
4/14/98 1:05	52.676	-19.555	4/13/98 23:05	60.687	-0.065
4/14/98 1:09	51.424	-14.78	4/13/98 23:09	60.651	0.21
4/14/98 1:13	50.365	-11.28	4/13/98 23:13	60.651	0.21
4/14/98 1:17	48.765	-4.19	4/13/98 23:17	60.674	-0.1

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4/14/98 1:21	48.468	-3.985	4/13/98 23:21	60.693	-0.295
4/14/98 1:25	48.109	-8.53	4/13/98 23:25	60.693	-0.215
4/14/98 1:29	47.927	-10.7	4/13/98 23:29	60.654	0.175
4/14/98 1:33	47.671	-17.375	4/13/98 23:33	60.634	0.195
4/14/98 1:37	46.403	-19.33	4/13/98 23:37	60.65	0.245
4/14/98 1:41	45.787	-24.85	4/13/98 23:41	60.689	-0.045
4/14/98 1:45	44.196	-26.03	4/13/98 23:45	60.673	0.09
4/14/98 1:49	42.537	-27.02	4/13/98 23:49	60.699	-0.065
4/14/98 1:53	40.817	-27.82	4/13/98 23:53	60.68	0.085
4/14/98 1:57	38.99	-28.23	4/13/98 23:57	60.691	-0.13
4/14/98 2:01	37.133	-28.515	4/14/98 0:01	60.686	0.01
4/14/98 2:05	35.253	-28.635	4/14/98 0:05	60.697	-0.125
4/14/98 2:09	33.344	-26.29	4/14/98 0:09	60.665	0.055
4/14/98 2:13	31.43	-24.16	4/14/98 0:13	60.688	-0.045
4/14/98 2:17	29.526	-21.695	4/14/98 0:17	60.672	0.075
4/14/98 2:21	28.086	-17.12	4/14/98 0:21	60.676	-3.99
4/14/98 2:25	26.598	-10.15	4/14/98 0:25	60.679	-9.985
4/14/98 2:29	25.187	-9.97	4/14/98 0:29	60.687	-17.375
4/14/98 2:33	24.662	-10.395	4/14/98 0:33	59.878	-22.1
4/14/98 2:37	24.568	-11.42	4/14/98 0:37	58.682	-25
4/14/98 2:41	23.193	-5.1	4/14/98 0:41	57.212	-26.89
4/14/98 2:45	22.583	-2.605	4/14/98 0:45	55.458	-27.4
4/14/98 2:49	22.284	-1.36	4/14/98 0:49	53.682	-27.86
4/14/98 2:53	22.173	-0.955	4/14/98 0:53	51.834	-28.31
4/14/98 2:57	22.062	-0.44	4/14/98 0:57	49.978	-28.65
4/14/98 3:01	22.012	-0.23	4/14/98 1:01	48.11	-28.965
4/14/98 3:05	21.982	-0.105	4/14/98 1:05	46.172	-28.805
4/14/98 3:09	21.974	0	4/14/98 1:09	44.248	-28.83
4/14/98 3:13	21.966	-0.025	4/14/98 1:13	42.317	-28.77
4/14/98 3:17	21.961	0.07	4/14/98 1:17	40.411	-28.57
4/14/98 3:21	21.974	-3.135	4/14/98 1:21	38.482	-28.67
4/14/98 3:25	21.961	-12.245	4/14/98 1:25	36.563	-28.975
4/14/98 3:29	21.975	-21.475	4/14/98 1:29	34.697	-29.375
4/14/98 3:33	21.347	-27.545	4/14/98 1:33	32.748	-27.445
4/14/98 3:37	19.512	-27.835	4/14/98 1:37	30.768	-25.815
4/14/98 3:41	17.68	-28.085	4/14/98 1:41	28.822	-22.395
4/14/98 3:45	15.838	-27.8	4/14/98 1:45	27.259	-17.585
4/14/98 3:49	13.945	-28.052	4/14/98 1:49	25.605	-10.995
4/14/98 3:53	12.063	-28.2735	4/14/98 1:53	24.343	-9.15
4/14/98 3:57	10.278	-29.1515	4/14/98 1:57	23.742	-7.505
4/14/98 4:01	8.3346	-28.8885	4/14/98 2:01	23.406	-6.545
4/14/98 4:05	6.4083	-28.2005	4/14/98 2:05	22.513	-2.72
4/14/98 4:09	4.4477	-28.1915	4/14/98 2:09	22.241	-1.48
4/14/98 4:13	2.5569	-28.6155	4/14/98 2:13	22.097	-0.9
4/14/98 4:17	0.76821	-29.2631	4/14/98 2:17	21.969	-0.4
4/14/98 4:21	-1.1906	-29.013	4/14/98 2:21	21.945	-0.42
4/14/98 4:25	-3.1662	-28.853	4/14/98 2:25	21.917	-0.13
4/14/98 4:29	-5.0844	-28.708	4/14/98 2:29	21.889	-0.13
4/14/98 4:33	-6.9932	-28.199	4/14/98 2:33	21.861	0.075

4/14/98 4:37	-8.9368	-27.766	4/14/98 2:37	21.891	-0.32
4/14/98 4:41	-10.826	-28.155	4/14/98 2:41	21.863	-0.115
4/14/98 4:45	-12.633	-28.79	4/14/98 2:45	21.876	-0.11
4/14/98 4:49	-14.49	-29.24	4/14/98 2:49	21.827	-0.015
4/14/98 4:53	-16.457	-29.23	4/14/98 2:53	21.84	-0.225
4/14/98 4:57	-18.391	-28.18	4/14/98 2:57	21.854	-0.13
4/14/98 5:01	-20.338	-28.28	4/14/98 3:01	21.824	-0.125
4/14/98 5:05	-22.303	-21.145	4/14/98 3:05	21.795	0.105
4/14/98 5:09	-24.027	-23.47	4/14/98 3:09	21.828	-0.1
4/14/98 5:13	-25.994	-18.065	4/14/98 3:13	21.799	-0.025
4/14/98 5:17	-26.532	-16.955	4/14/98 3:17	21.816	-0.035
4/14/98 5:21	-28.721	-7.705	4/14/98 3:21	21.808	-3.865
4/14/98 5:25	-29.607	-3.895	4/14/98 3:25	21.794	-12.875
4/14/98 5:29	-29.923	1.76	4/14/98 3:29	21.809	-22.22
4/14/98 5:33	-30.262	3.09	4/14/98 3:33	21.035	-27.99
4/14/98 5:37	-30.386	4.21	4/14/98 3:37	19.219	-28.38
4/14/98 5:41	-29.571	-0.07	4/14/98 3:41	17.365	-28.53
4/14/98 5:45	-29.644	0.325	4/14/98 3:45	15.437	-27.6105
4/14/98 5:49	-29.544	-0.24	4/14/98 3:49	13.543	-28.0785
4/14/98 5:53	-29.585	-0.005	4/14/98 3:53	11.659	-28.5145
4/14/98 5:57	-29.579	-0.12	4/14/98 3:57	9.9149	-29.4985
4/14/98 6:01	-29.592	0.095	4/14/98 4:01	7.9273	-29.241
4/14/98 6:05	-29.586	0.07	4/14/98 4:05	5.9561	-28.5567
4/14/98 6:09	-29.603	-0.02	4/14/98 4:09	4.0152	-28.548
4/14/98 6:13	-29.573	-0.03	4/14/98 4:13	2.0791	-28.537
4/14/98 6:17	-29.572	-0.08	4/14/98 4:17	0.24477	-29.0779
4/14/98 6:21	-29.607	0.025	4/14/98 4:21	-1.6944	-29.0475
4/14/98 6:25	-29.579	-0.205	4/14/98 4:25	-3.6283	-29.108
4/14/98 6:29	-29.588	-0.135	4/14/98 4:29	-5.5708	-28.741
4/14/98 6:33	-29.602	-0.15	4/14/98 4:33	-7.5039	-28.5705
4/14/98 6:37	-29.62	0.105	4/14/98 4:37	-9.4499	-27.8005
4/14/98 6:41	-29.615	-0.1	4/14/98 4:41	-11.319	-28.3
4/14/98 6:45	-29.632	0.15	4/14/98 4:45	-13.218	-28.375
4/14/98 6:49	-29.599	-0.08	4/14/98 4:49	-15.01	-29.05
4/14/98 6:53	-29.635	0.195	4/14/98 4:53	-16.979	-29.73
4/14/98 6:57	-29.602	-0.015	4/14/98 4:57	-18.893	-29.14
4/14/98 7:01	-29.615	-0.365	4/14/98 5:01	-20.82	-29.825
4/14/98 7:05	-29.596	0.01	4/14/98 5:05	-22.925	-21.645
4/14/98 7:09	-29.605	0.45	4/14/98 5:09	-24.721	-24.1
4/14/98 7:13	-29.688	0.98	4/14/98 5:13	-26.785	-16.81
4/14/98 7:17	-29.594	0.18	4/14/98 5:17	-27.254	-16.28
4/14/98 7:21	-29.515	-0.15	4/14/98 5:21	-29.541	-5.955
4/14/98 7:25	-29.492	-0.215	4/14/98 5:25	-30.147	-3.43
4/14/98 7:29	-29.558	0.155	4/14/98 5:29	-30.51	3.635
4/14/98 7:33	-29.545	0.03	4/14/98 5:33	-30.732	3.56
4/14/98 7:37	-29.535	-0.075	4/14/98 5:37	-30.833	4.215
4/14/98 7:41	-29.527	-0.12	4/14/98 5:41	-29.783	-0.885
4/14/98 7:45	-29.539	-0.2	4/14/98 5:45	-30.02	0.445
4/14/98 7:49	-29.55	-0.075	4/14/98 5:49	-29.99	0.23

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4/14/98 7:53	-29.551	0.055	4/14/98 5:53	-29.96	0.11
4/14/98 7:57	-29.579	-0.07	4/14/98 5:57	-29.931	0.115
4/14/98 8:01	-29.565	-0.285	4/14/98 6:01	-29.944	0.095
4/14/98 8:05	-29.54	-0.25	4/14/98 6:05	-29.938	0.07
4/14/98 8:09	-29.593	0.015	4/14/98 6:09	-29.908	-0.02
4/14/98 8:13	-29.622	0.145	4/14/98 6:13	-29.925	-0.145
4/14/98 8:17	-29.59	-0.035	4/14/98 6:17	-29.924	0.035
4/14/98 8:21	-29.59	0.175	4/14/98 6:21	-29.912	-0.095
4/14/98 8:25	-29.593	0.17	4/14/98 6:25	-29.954	-0.09
4/14/98 8:29	-29.597	0.195	4/14/98 6:29	-29.917	-0.25
4/14/98 8:33	-29.555	0.12	4/14/98 6:33	-29.931	-0.15
4/14/98 8:37	-29.559	0.07	4/14/98 6:37	-29.972	0.225
4/14/98 8:41	-29.558	-0.01	4/14/98 6:41	-29.967	0.015
4/14/98 8:45	-29.531	-0.095	4/14/98 6:45	-29.961	0.035
4/14/98 8:49	-29.545	0.13	4/14/98 6:49	-29.927	-0.08
4/14/98 8:53	-29.56	0.105	4/14/98 6:53	-29.964	0.08
4/14/98 8:57	-29.55	0.05	4/14/98 6:57	-29.954	-0.01
4/14/98 9:01	-29.519	-0.105	4/14/98 7:01	-29.943	-0.37
4/14/98 9:05	-29.539	-0.085	4/14/98 7:05	-29.948	-0.11
4/14/98 9:09	-29.54	-0.06	4/14/98 7:09	-29.956	0.21
4/14/98 9:13	-29.54	-0.06	4/14/98 7:13	-30.017	0.4
4/14/98 9:17	-29.556	0.16	4/14/98 7:17	-29.97	0.065
4/14/98 9:21	-29.552	2.15	4/14/98 7:21	-29.914	-0.15
4/14/98 9:25	-29.552	8.575	4/14/98 7:25	-29.937	0.02
4/14/98 9:29	-29.524	17.175	4/14/98 7:29	-29.957	0.035
4/14/98 9:33	-29.122	24.05	4/14/98 7:33	-29.944	0.03
4/14/98 9:37	-27.837	26.69	4/14/98 7:37	-29.933	-0.195
4/14/98 9:41	-26.089	27.285	4/14/98 7:41	-29.95	-0.235
4/14/98 9:45	-24.312	27.845	4/14/98 7:45	-29.938	-0.2
4/14/98 9:49	-22.499	28.425	4/14/98 7:49	-29.972	-0.075
4/14/98 9:53	-20.632	28.695	4/14/98 7:53	-29.997	0.055
4/14/98 9:57	-18.743	28.67	4/14/98 7:57	-29.978	-0.07
4/14/98 10:01	-16.814	28.57	4/14/98 8:01	-29.987	-0.05
4/14/98 10:05	-14.893	28.381	4/14/98 8:05	-29.986	-0.015
4/14/98 10:09	-13.009	28.4305	4/14/98 8:09	-29.992	0.015
4/14/98 10:13	-11.1	28.301	4/14/98 8:13	-29.997	0.025
4/14/98 10:17	-9.2168	28.2455	4/14/98 8:17	-29.989	-0.035
4/14/98 10:21	-7.3229	28.2075	4/14/98 8:21	-29.989	0.18
4/14/98 10:25	-5.4398	28.18445	4/14/98 8:25	-29.992	0.055
4/14/98 10:29	-3.5677	28.286	4/14/98 8:29	-29.996	0.075
4/14/98 10:33	-1.6814	28.385	4/14/98 8:33	-29.953	-0.115
4/14/98 10:37	0.19709	28.30805	4/14/98 8:37	-29.981	-0.05
4/14/98 10:41	2.0895	28.317	4/14/98 8:41	-29.981	-0.36
4/14/98 10:45	3.9956	28.3525	4/14/98 8:45	-29.976	0.02
4/14/98 10:49	5.8587	28.5115	4/14/98 8:49	-29.991	-0.105
4/14/98 10:53	7.7529	28.6205	4/14/98 8:53	-30.053	0.225
4/14/98 10:57	9.6661	28.5195	4/14/98 8:57	-29.972	-0.07
4/14/98 11:01	11.561	28.435	4/14/98 9:01	-30.012	-0.105
4/14/98 11:05	13.477	28.3	4/14/98 9:05	-30.008	-0.085

4/14/98 11:09	15.37	28.24	4/14/98 9:09	-29.986	-0.055
4/14/98 11:13	17.248	27.185	4/14/98 9:13	-30.033	0.06
4/14/98 11:17	19.137	20.76	4/14/98 9:17	-30.025	0.04
4/14/98 11:21	21.018	12.195	4/14/98 9:21	-29.997	1.445
4/14/98 11:25	22.685	4.99	4/14/98 9:25	-30.021	8.465
4/14/98 11:29	23.289	1.255	4/14/98 9:29	-30.017	17.315
4/14/98 11:33	23.457	-1.65	4/14/98 9:33	-29.708	24.78
4/14/98 11:37	23.683	-3.305	4/14/98 9:37	-28.328	27.185
4/14/98 11:41	23.54	-2.825	4/14/98 9:41	-26.554	27.315
4/14/98 11:45	23.127	-0.975	4/14/98 9:45	-24.752	27.76
4/14/98 11:49	23.022	-0.46	4/14/98 9:49	-22.891	27.885
4/14/98 11:53	22.975	-0.235	4/14/98 9:53	-21.091	28.615
4/14/98 11:57	22.932	0.37	4/14/98 9:57	-19.2	28.705
4/14/98 12:01	22.93	5.625	4/14/98 10:01	-17.314	28.49
4/14/98 12:05	22.928	13.26	4/14/98 10:05	-15.368	28.4125
4/14/98 12:09	23.006	21.315	4/14/98 10:09	-13.459	28.4585
4/14/98 12:13	24.055	25.31	4/14/98 10:13	-11.616	28.7795
4/14/98 12:17	25.58	26.765	4/14/98 10:17	-9.6855	28.4965
4/14/98 12:21	27.269	27.63	4/14/98 10:21	-7.7673	28.6755
4/14/98 12:25	29.117	27.815	4/14/98 10:25	-5.8601	28.7576
4/14/98 12:29	30.933	28.105	4/14/98 10:29	-3.9862	29.2915
4/14/98 12:33	32.795	28.15	4/14/98 10:33	-2.0322	28.8405
4/14/98 12:37	34.68	28.245	4/14/98 10:37	-0.10858	29.0819
4/14/98 12:41	36.554	28.34	4/14/98 10:41	1.8721	28.331
4/14/98 12:45	38.425	28.295	4/14/98 10:45	3.7359	28.6895
4/14/98 12:49	40.329	28.355	4/14/98 10:49	5.7078	28.306
4/14/98 12:53	42.222	28.23	4/14/98 10:53	7.5383	28.5285
4/14/98 12:57	44.084	28.37	4/14/98 10:57	9.4738	28.316
4/14/98 13:01	46	28.3	4/14/98 11:01	11.369	28.45
4/14/98 13:05	47.868	28.24	4/14/98 11:05	13.244	28.52
4/14/98 13:09	49.758	28.13	4/14/98 11:09	15.137	28.47
4/14/98 13:13	51.66	28.075	4/14/98 11:13	17.059	26.57
4/14/98 13:17	53.516	26.975	4/14/98 11:17	18.948	18.59
4/14/98 13:21	55.384	25.565	4/14/98 11:21	20.831	10.845
4/14/98 13:25	57.275	18.805	4/14/98 11:25	22.373	3.855
4/14/98 13:29	58.911	11.165	4/14/98 11:29	22.666	0.53
4/14/98 13:33	60.497	3.675	4/14/98 11:33	23	-2.585
4/14/98 13:37	61.036	1.115	4/14/98 11:37	23.144	-3.73
4/14/98 13:41	61.144	0.435	4/14/98 11:41	22.772	-2.105
4/14/98 13:45	61.232	-2.54	4/14/98 11:45	22.483	-0.875
4/14/98 13:49	61.259	-3.665	4/14/98 11:49	22.398	-0.355
4/14/98 13:53	61.231	-4.03	4/14/98 11:53	22.351	0.08
4/14/98 13:57	60.724	-1.715	4/14/98 11:57	22.308	1.83
4/14/98 14:01	60.526	-0.81	4/14/98 12:01	22.327	8.015
4/14/98 14:05	60.425	-0.39	4/14/98 12:05	22.367	15.55
4/14/98 14:09	60.381	-0.08	4/14/98 12:09	22.674	22.875
4/14/98 14:13	60.364	-0.115	4/14/98 12:13	23.93	25.625
4/14/98 14:17	60.347	-0.055	4/14/98 12:17	25.477	27.075
4/14/98 14:21	60.365	-0.09	4/14/98 12:21	27.249	27.625

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4/14/98 14:25	60.341	-0.03	4/14/98 12:25	29.055	28.025
4/14/98 14:29	60.336	-0.065	4/14/98 12:29	30.892	28.21
4/14/98 14:33	60.347	-0.165	4/14/98 12:33	32.774	28.255
4/14/98 14:37	60.335	-0.07	4/14/98 12:37	34.66	28.345
4/14/98 14:41	60.323	0.14	4/14/98 12:41	36.534	28.44
4/14/98 14:45	60.314	0.04	4/14/98 12:45	38.425	28.395
4/14/98 14:49	60.321	0.065	4/14/98 12:49	40.329	28.455
4/14/98 14:53	60.351	-0.125	4/14/98 12:53	42.222	28.43
4/14/98 14:57	60.322	0.095	4/14/98 12:57	44.104	28.465
4/14/98 15:01	60.334	0.075	4/14/98 13:01	46.02	28.495
4/14/98 15:05	60.326	-0.02	4/14/98 13:05	47.908	28.53
4/14/98 15:09	60.341	-0.06	4/14/98 13:09	49.797	28.715
4/14/98 15:13	60.349	0.05	4/14/98 13:13	51.719	28.755
4/14/98 15:17	60.322	0.05	4/14/98 13:17	53.614	26.97
4/14/98 15:21	60.329	0.19	4/14/98 13:21	55.54	25.555
4/14/98 15:25	60.359	0.16	4/14/98 13:25	57.47	16.675
4/14/98 15:29	60.332	0.175	4/14/98 13:29	59.008	7.01
4/14/98 15:33	60.367	-0.1	4/14/98 13:33	60.651	-1.63
4/14/98 15:37	60.391	-0.285	4/14/98 13:37	60.805	-2.655
4/14/98 15:41	60.367	-0.035	4/14/98 13:41	60.41	-0.82
4/14/98 15:45	60.347	0.005	4/14/98 13:45	60.325	-0.32
4/14/98 15:49	60.334	0.105	4/14/98 13:49	60.274	-0.38
4/14/98 15:53	60.36	-0.07	4/14/98 13:53	60.246	-0.265
4/14/98 15:57	60.348	0.06	4/14/98 13:57	60.261	-0.265
4/14/98 16:01	60.355	0	4/14/98 14:01	60.198	0.06
4/14/98 16:05	60.346	0.1	4/14/98 14:05	60.193	-0.1
4/14/98 16:09	60.36	-0.035	4/14/98 14:09	60.208	-0.18
4/14/98 16:13	60.355	-0.07	4/14/98 14:13	60.21	-0.12
4/14/98 16:17	60.366	-0.13	4/14/98 14:17	60.173	0.04
4/14/98 16:21	60.353	-0.025	4/14/98 14:21	60.172	0.2
4/14/98 16:25	60.341	-0.02	4/14/98 14:25	60.186	0.065
4/14/98 16:29	60.34	0.005	4/14/98 14:29	60.181	0.13
4/14/98 16:33	60.348	0.065	4/14/98 14:33	60.212	0.025
4/14/98 16:37	60.337	0.14	4/14/98 14:37	60.199	-0.16
4/14/98 16:41	60.341	0.14	4/14/98 14:41	60.207	-0.05
4/14/98 16:45	60.361	-0.055	4/14/98 14:45	60.217	-0.055
4/14/98 16:49	60.365	-0.075	4/14/98 14:49	60.167	0.16
4/14/98 16:53	60.369	-0.115	4/14/98 14:53	60.197	-0.125
4/14/98 16:57	60.35	0.105	4/14/98 14:57	60.206	0
4/14/98 17:01	60.35	-0.19	4/14/98 15:01	60.199	-0.02
4/14/98 17:05	60.346	-0.06	4/14/98 15:05	60.172	0.17
4/14/98 17:09	60.371	-0.17	4/14/98 15:09	60.206	0.135
4/14/98 17:13	60.312	0.215	4/14/98 15:13	60.195	0.05
4/14/98 17:17	60.334	0.105	4/14/98 15:17	60.206	0.05
4/14/98 17:21	60.337	0.105	4/14/98 15:21	60.233	-0.005
4/14/98 17:25	60.355	-2.96	4/14/98 15:25	60.205	0.16
4/14/98 17:29	60.355	-8.97	4/14/98 15:29	60.216	0.08
4/14/98 17:33	60.358	-17	4/14/98 15:33	60.232	-0.1
4/14/98 17:37	59.763	-22.975	4/14/98 15:37	60.237	-0.095

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4/14/98 17:41	58.561	-26.125	4/14/98 15:41	60.232	-0.035
4/14/98 17:45	56.958	-27.495	4/14/98 15:45	60.212	0.1
4/14/98 17:49	55.168	-28.045	4/14/98 15:49	60.218	0.105
4/14/98 17:53	53.336	-28.34	4/14/98 15:53	60.225	-0.07
4/14/98 17:57	51.459	-28.285	4/14/98 15:57	60.232	-0.035
4/14/98 18:01	49.559	-28.245	4/14/98 16:01	60.239	-0.095
4/14/98 18:05	47.668	-28.585	4/14/98 16:05	60.211	0
4/14/98 18:09	45.802	-28.66	4/14/98 16:09	60.225	-0.13
4/14/98 18:13	43.91	-28.81	4/14/98 16:13	60.22	0.025
4/14/98 18:17	41.951	-28.335	4/14/98 16:17	60.211	-0.03
4/14/98 18:21	40.07	-28.61	4/14/98 16:21	60.199	0.165
4/14/98 18:25	38.148	-28.575	4/14/98 16:25	60.225	-0.115
4/14/98 18:29	36.284	-28.97	4/14/98 16:29	60.205	-0.09
4/14/98 18:33	34.348	-28.96	4/14/98 16:33	60.232	-0.03
4/14/98 18:37	32.433	-24.745	4/14/98 16:37	60.202	0.14
4/14/98 18:41	30.49	-23.915	4/14/98 16:41	60.187	0.135
4/14/98 18:45	28.556	-19.035	4/14/98 16:45	60.226	0.04
4/14/98 18:49	27.484	-15.975	4/14/98 16:49	60.23	0.02
4/14/98 18:53	25.707	-8.165	4/14/98 16:53	60.214	0.18
4/14/98 18:57	24.749	-3.845	4/14/98 16:57	60.234	-0.09
4/14/98 19:01	24.289	-1.835	4/14/98 17:01	60.234	0
4/14/98 19:05	24.074	-0.815	4/14/98 17:05	60.25	0.03
4/14/98 19:09	23.98	-0.375	4/14/98 17:09	60.216	0.025
4/14/98 19:13	23.922	-0.245	4/14/98 17:13	60.234	-0.07
4/14/98 19:17	23.911	-0.245	4/14/98 17:17	60.256	-0.085
4/14/98 19:21	23.905	-0.185	4/14/98 17:21	60.221	0.01
4/14/98 19:25	23.873	0.02	4/14/98 17:25	60.22	-3.74
4/14/98 19:29	23.862	0.125	4/14/98 17:29	60.239	-10.52
4/14/98 19:33	23.868	-0.065	4/14/98 17:33	60.223	-18.85
4/14/98 19:37	23.877	-2.45	4/14/98 17:37	59.472	-24.25
4/14/98 19:41	23.887	-11.77	4/14/98 17:41	58.135	-26.93
4/14/98 19:45	23.855	-21.105	4/14/98 17:45	56.453	-28.115
4/14/98 19:49	23.387	-28.3	4/14/98 17:49	54.622	-28.175
4/14/98 19:53	21.533	-28.39	4/14/98 17:53	52.749	-28.375
4/14/98 19:57	19.634	-28.315	4/14/98 17:57	50.83	-28.215
4/14/98 20:01	17.727	-28.345	4/14/98 18:01	48.987	-28.57
4/14/98 20:05	15.855	-28.5	4/14/98 18:05	47.074	-28.515
4/14/98 20:09	13.971	-28.7655	4/14/98 18:09	45.187	-28.695
4/14/98 20:13	12.058	-28.584	4/14/98 18:13	43.273	-28.645
4/14/98 20:17	10.155	-28.735	4/14/98 18:17	41.371	-28.675
4/14/98 20:21	8.2179	-28.507	4/14/98 18:21	39.448	-28.545
4/14/98 20:25	6.3412	-28.7524	4/14/98 18:25	37.544	-28.815
4/14/98 20:29	4.408	-29.1975	4/14/98 18:29	35.636	-28.695
4/14/98 20:33	2.5165	-28.799	4/14/98 18:33	33.739	-28.79
4/14/98 20:37	0.59073	-28.5092	4/14/98 18:37	31.781	-24.575
4/14/98 20:41	-1.4315	-27.668	4/14/98 18:41	29.897	-24.15
4/14/98 20:45	-3.2433	-28.0315	4/14/98 18:45	27.981	-18.44
4/14/98 20:49	-5.1111	-28.0445	4/14/98 18:49	26.866	-14.75
4/14/98 20:53	-6.9651	-28.4145	4/14/98 18:53	25.067	-7.555

4/14/98 20:57	-8.8496	-28.687	4/14/98 18:57	24.293	-4.365
4/14/98 21:01	-10.72	-28.945	4/14/98 19:01	23.916	-2.355
4/14/98 21:05	-12.648	-28.87	4/14/98 19:05	23.556	-0.61
4/14/98 21:09	-14.587	-28.785	4/14/98 19:09	23.42	0.04
4/14/98 21:13	-16.509	-28.855	4/14/98 19:13	23.445	-0.14
4/14/98 21:17	-18.422	-28.785	4/14/98 19:17	23.434	-0.035
4/14/98 21:21	-20.344	-28.64	4/14/98 19:21	23.428	0.125
4/14/98 21:25	-22.28	-21.735	4/14/98 19:25	23.417	0.02
4/14/98 21:29	-24.179	-22.02	4/14/98 19:29	23.427	0.015
4/14/98 21:33	-26.072	-18.16	4/14/98 19:33	23.453	-0.48
4/14/98 21:37	-26.627	-17.95	4/14/98 19:37	23.421	-0.38
4/14/98 21:41	-28.583	-9.145	4/14/98 19:41	23.43	-7.09
4/14/98 21:45	-29.704	-4.35	4/14/98 19:45	23.357	-16.21
4/14/98 21:49	-30.217	-1.875	4/14/98 19:49	23.345	-25.675
4/14/98 21:53	-30.412	-0.985	4/14/98 19:53	22.012	-28.575
4/14/98 21:57	-30.574	-0.38	4/14/98 19:57	20.115	-28.71
4/14/98 22:01	-30.592	-0.24	4/14/98 20:01	18.21	-28.845
4/14/98 22:05	-30.609	-0.22	4/14/98 20:05	16.297	-28.79
4/14/98 22:09	-30.65	0.09	4/14/98 20:09	14.373	-28.633
4/14/98 22:13	-30.64	-0.48	4/14/98 20:13	12.441	-28.24
4/14/98 22:17	-30.653	0.1	4/14/98 20:17	10.539	-28.3865
4/14/98 22:21	-30.632	0.16	4/14/98 20:21	8.6464	-28.588
4/14/98 22:25	-30.736	0.75	4/14/98 20:25	6.793	-29.1586
4/14/98 22:29	-30.633	0.185	4/14/98 20:29	4.8617	-29.1669
4/14/98 22:33	-30.6	0.14	4/14/98 20:33	2.9288	-28.4415
4/14/98 22:37	-30.586	-0.085	4/14/98 20:37	0.96128	-28.1539
4/14/98 22:41	-30.596	-0.055	4/14/98 20:41	-0.97167	-27.7492
4/14/98 22:45	-30.572	-0.31	4/14/98 20:45	-2.7595	-28.445
4/14/98 22:49	-30.603	-0.195	4/14/98 20:49	-4.6695	-28.3525
4/14/98 22:53	-30.607	-0.2	4/14/98 20:53	-6.5215	-28.7225
4/14/98 22:57	-30.634	-0.18	4/14/98 20:57	-8.4485	-28.8825
4/14/98 23:01	-30.642	-0.045	4/14/98 21:01	-10.34	-29.37
4/14/98 23:05	-30.647	0.08	4/14/98 21:05	-12.266	-29.41
4/14/98 23:09	-30.67	0.17	4/14/98 21:09	-14.225	-29.105
4/14/98 23:13	-30.651	0.075	4/14/98 21:13	-16.214	-28.945
4/14/98 23:17	-30.631	0.075	4/14/98 21:17	-18.148	-28.765
4/14/98 23:21	-30.636	-0.04	4/14/98 21:21	-20.046	-28.735
4/14/98 23:25	-30.636	0.035	4/14/98 21:25	-22.003	-26.38
4/14/98 23:29	-30.616	-0.23	4/14/98 21:29	-23.901	-18.97
4/14/98 23:33	-30.644	0.01	4/14/98 21:33	-25.793	-20.845
4/14/98 23:37	-30.629	-0.11	4/14/98 21:37	-27.279	-16.215
4/14/98 23:41	-30.662	0.01	4/14/98 21:41	-27.695	-15.58
4/14/98 23:45	-30.642	0.005	4/14/98 21:45	-29.962	-4.71
4/14/98 23:49	-30.651	0.145	4/14/98 21:49	-30.522	-1.995
4/14/98 23:53	-30.66	-0.065	4/14/98 21:53	-30.811	-0.99
4/14/98 23:57	-30.641	-0.065	4/14/98 21:57	-30.904	-0.495
4/15/98 0:01	-30.622	-0.18	4/14/98 22:01	-30.921	-0.475
4/15/98 0:05	-30.673	-0.035	4/14/98 22:05	-31.009	0.015
4/15/98 0:09	-30.654	-0.65	4/14/98 22:09	-31.003	-0.025

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4/15/98 0:13	-30.658	-0.33	4/14/98 22:13	-31.016	-0.25
4/15/98 0:17	-30.68	0.225	4/14/98 22:17	-31.006	-0.015
4/15/98 0:21	-30.784	0.7	4/14/98 22:21	-31.008	0.16
4/15/98 0:25	-30.724	0.705	4/14/98 22:25	-31.066	0.405
4/15/98 0:29	-30.635	0.1	4/14/98 22:29	-31.009	0.415
4/15/98 0:33	-30.644	0.305	4/14/98 22:33	-30.976	0.14
4/15/98 0:37	-30.583	-0.275	4/14/98 22:37	-30.985	0.38
4/15/98 0:41	-30.615	-0.125	4/14/98 22:41	-30.926	0.07
4/15/98 0:45	-30.583	-0.34	4/14/98 22:45	-30.948	0.16
4/15/98 0:49	-30.638	-0.08	4/14/98 22:49	-30.909	-0.08
4/15/98 0:53	-30.64	-0.09	4/14/98 22:53	-30.912	0.035
4/15/98 0:57	-30.651	-0.19	4/14/98 22:57	-30.916	-0.065
4/15/98 1:01	-30.654	-0.1	4/14/98 23:01	-30.925	0.08
4/15/98 1:05	-30.658	0.015	4/14/98 23:05	-30.905	-0.045
4/15/98 1:09	-30.689	0.01	4/14/98 23:09	-30.929	0.175
4/15/98 1:13	-30.674	0.15	4/14/98 23:13	-30.909	-0.045
4/15/98 1:17	-30.655	-0.085	4/14/98 23:17	-30.914	-0.04
4/15/98 1:21	-30.687	0.035	4/14/98 23:21	-30.894	-0.16
4/15/98 1:25	-30.644	0.01	4/14/98 23:25	-30.918	-0.32
4/15/98 1:29	-30.672	0.01	4/14/98 23:29	-30.922	-0.11
4/15/98 1:33	-30.68	-0.23	4/14/98 23:33	-30.926	0.005
4/15/98 1:37	-30.642	-0.11	4/14/98 23:37	-30.982	0.245
4/15/98 1:41	-30.67	5.035	4/14/98 23:41	-30.944	0.125
4/15/98 1:45	-30.726	13.7	4/14/98 23:45	-30.925	-0.105
4/15/98 1:49	-30.664	22.55	4/14/98 23:49	-30.933	0.03
4/15/98 1:53	-29.663	26.665	4/14/98 23:53	-30.919	-0.065
4/15/98 1:57	-27.986	27.495	4/14/98 23:57	-30.946	0.17
4/15/98 2:01	-26.154	27.715	4/15/98 0:01	-30.927	0.05
4/15/98 2:05	-24.33	27.84	4/15/98 0:05	-30.932	-0.505
4/15/98 2:09	-22.487	28.19	4/15/98 0:09	-30.912	-0.42
4/15/98 2:13	-20.611	28.425	4/15/98 0:13	-30.917	-0.325
4/15/98 2:17	-18.762	28.625	4/15/98 0:17	-31.033	0.58
4/15/98 2:21	-16.849	28.645	4/15/98 0:21	-30.996	0.35
4/15/98 2:25	-14.926	28.438	4/15/98 0:25	-30.982	0.47
4/15/98 2:29	-13.037	28.23	4/15/98 0:29	-30.917	0.095
4/15/98 2:33	-11.12	28.195	4/15/98 0:33	-30.926	0.185
4/15/98 2:37	-9.2384	28.1845	4/15/98 0:37	-30.888	-0.04
4/15/98 2:41	-7.391	28.5235	4/15/98 0:41	-30.898	-0.12
4/15/98 2:45	-5.481	28.28955	4/15/98 0:45	-30.889	-0.1
4/15/98 2:49	-3.6015	28.386	4/15/98 0:49	-30.896	-0.085
4/15/98 2:53	-1.6863	28.263	4/15/98 0:53	-30.922	0.03
4/15/98 2:57	0.17691	28.36045	4/15/98 0:57	-30.909	-0.08
4/15/98 3:01	2.0757	28.367	4/15/98 1:01	-30.913	-0.1
4/15/98 3:05	3.9663	28.355	4/15/98 1:05	-30.916	0.13
4/15/98 3:09	5.849	28.43	4/15/98 1:09	-30.925	0.015
4/15/98 3:13	7.7491	28.2945	4/15/98 1:13	-30.933	0.15
4/15/98 3:17	9.6373	28.2785	4/15/98 1:17	-30.89	-0.2
4/15/98 3:21	11.535	28.205	4/15/98 1:21	-30.922	-0.085
4/15/98 3:25	13.408	28.535	4/15/98 1:25	-30.903	-0.105

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4/15/98 3:29	15.293	27.19	4/15/98 1:29	-30.93	0.005
4/15/98 3:33	17.176	19.955	4/15/98 1:33	-30.939	-0.345
4/15/98 3:37	19.115	11.36	4/15/98 1:37	-30.924	0.01
4/15/98 3:41	20.731	4.295	4/15/98 1:41	-30.929	5.745
4/15/98 3:45	21.167	2.485	4/15/98 1:45	-31.008	15.11
4/15/98 3:49	21.387	1.425	4/15/98 1:49	-30.922	23.955
4/15/98 3:53	21.59	0.43	4/15/98 1:53	-29.78	27.595
4/15/98 3:57	21.664	0.285	4/15/98 1:57	-27.986	27.84
4/15/98 4:01	21.672	0.39	4/15/98 2:01	-26.131	27.83
4/15/98 4:05	21.676	0.33	4/15/98 2:05	-24.261	27.95
4/15/98 4:09	21.721	0.12	4/15/98 2:09	-22.418	28.3
4/15/98 4:13	21.75	4.045	4/15/98 2:13	-20.565	28.645
4/15/98 4:17	21.742	11.26	4/15/98 2:17	-18.671	28.735
4/15/98 4:21	21.745	19.555	4/15/98 2:21	-16.758	28.75
4/15/98 4:25	22.559	24.57	4/15/98 2:25	-14.836	28.657
4/15/98 4:29	23.994	26.65	4/15/98 2:29	-12.924	28.4425
4/15/98 4:33	25.656	27.73	4/15/98 2:33	-11.008	28.409
4/15/98 4:37	27.473	27.985	4/15/98 2:37	-9.1046	28.286
4/15/98 4:41	29.324	28.075	4/15/98 2:41	-7.2355	28.4035
4/15/98 4:45	31.202	28.085	4/15/98 2:45	-5.3262	28.49755
4/15/98 4:49	33.07	28.29	4/15/98 2:49	-3.4474	28.4845
4/15/98 4:53	34.939	28.345	4/15/98 2:53	-1.5548	28.471
4/15/98 4:57	36.819	28.405	4/15/98 2:57	0.37331	28.45545
4/15/98 5:01	38.728	28.31	4/15/98 3:01	2.2495	28.4635
4/15/98 5:05	40.608	28.36	4/15/98 3:05	4.1394	28.558
4/15/98 5:09	42.5	28.3	4/15/98 3:09	6.0644	28.523
4/15/98 5:13	44.39	28.315	4/15/98 3:13	7.9422	28.599
4/15/98 5:17	46.28	28.42	4/15/98 3:17	9.851	28.475
4/15/98 5:21	48.16	28.33	4/15/98 3:21	11.769	28.4
4/15/98 5:25	50.053	28.13	4/15/98 3:25	13.662	28.73
4/15/98 5:29	51.964	28.12	4/15/98 3:29	15.546	25.09
4/15/98 5:33	53.826	26.385	4/15/98 3:33	17.449	16.92
4/15/98 5:37	55.679	24.865	4/15/98 3:37	19.408	8.23
4/15/98 5:41	57.588	19.33	4/15/98 3:41	20.564	3.15
4/15/98 5:45	59.103	11.435	4/15/98 3:45	20.833	1.97
4/15/98 5:49	60.652	0.715	4/15/98 3:49	21.054	1.005
4/15/98 5:53	61.454	-4.535	4/15/98 3:53	21.194	0.43
4/15/98 5:57	61.39	-4.84	4/15/98 3:57	21.227	0.39
4/15/98 6:01	60.795	-2.215	4/15/98 4:01	21.255	0.185
4/15/98 6:05	60.547	-1.055	4/15/98 4:05	21.28	0.125
4/15/98 6:09	60.422	-0.53	4/15/98 4:09	21.305	0.115
4/15/98 6:13	60.352	-0.3	4/15/98 4:13	21.292	4.36
4/15/98 6:17	60.336	-0.02	4/15/98 4:17	21.305	11.68
4/15/98 6:21	60.316	-0.035	4/15/98 4:21	21.328	19.985
4/15/98 6:25	60.292	0.185	4/15/98 4:25	22.164	24.9
4/15/98 6:29	60.332	-0.015	4/15/98 4:29	23.641	26.88
4/15/98 6:33	60.309	0.025	4/15/98 4:33	25.325	27.855
4/15/98 6:37	60.329	-0.13	4/15/98 4:37	27.144	28.205
4/15/98 6:41	60.329	-0.085	4/15/98 4:41	29.017	28.29

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4/15/98 6:45	60.314	0.1	4/15/98 4:45	30.896	28.4
4/15/98 6:49	60.303	0.005	4/15/98 4:49	32.785	28.51
4/15/98 6:53	60.312	-0.075	4/15/98 4:53	34.675	28.46
4/15/98 6:57	60.334	-0.13	4/15/98 4:57	36.576	28.52
4/15/98 7:01	60.304	0.025	4/15/98 5:01	38.487	28.32
4/15/98 7:05	60.297	0.1	4/15/98 5:05	40.367	28.575
4/15/98 7:09	60.308	0.005	4/15/98 5:09	42.28	28.51
4/15/98 7:13	60.309	0.01	4/15/98 5:13	44.151	28.525
4/15/98 7:17	60.317	0.015	4/15/98 5:17	46.082	28.525
4/15/98 7:21	60.309	0.08	4/15/98 5:21	47.982	28.635
4/15/98 7:25	60.311	-0.04	4/15/98 5:25	49.856	28.825
4/15/98 7:29	60.32	-0.03	4/15/98 5:29	51.787	28.81
4/15/98 7:33	60.325	-0.095	4/15/98 5:33	53.709	26.97
4/15/98 7:37	60.303	0.085	4/15/98 5:37	55.621	25.635
4/15/98 7:41	60.314	0.105	4/15/98 5:41	57.549	19.525
4/15/98 7:45	60.306	0.025	4/15/98 5:45	59.103	11.145
4/15/98 7:49	60.32	0.045	4/15/98 5:49	60.748	-0.73
4/15/98 7:53	60.335	-0.17	4/15/98 5:53	61.454	-5.405
4/15/98 7:57	60.311	0.085	4/15/98 5:57	61.332	-5.42
4/15/98 8:01	60.329	-0.11	4/15/98 6:01	60.602	-2.025
4/15/98 8:05	60.301	0.11	4/15/98 6:05	60.373	-1.055
4/15/98 8:09	60.328	-0.065	4/15/98 6:09	60.248	-0.43
4/15/98 8:13	60.307	0.03	4/15/98 6:13	60.197	-0.3
4/15/98 8:17	60.323	-0.11	4/15/98 6:17	60.162	-0.02
4/15/98 8:21	60.315	-0.02	4/15/98 6:21	60.162	-0.13
4/15/98 8:25	60.313	-0.035	4/15/98 6:25	60.137	0.095
4/15/98 8:29	60.301	0.095	4/15/98 6:29	60.158	-0.015
4/15/98 8:33	60.311	0.08	4/15/98 6:33	60.136	-0.075
4/15/98 8:37	60.306	0.105	4/15/98 6:37	60.156	0.06
4/15/98 8:41	60.32	-0.08	4/15/98 6:41	60.155	-0.085
4/15/98 8:45	60.327	-0.035	4/15/98 6:45	60.121	0
4/15/98 8:49	60.327	-0.15	4/15/98 6:49	60.168	-0.285
4/15/98 8:53	60.304	0.045	4/15/98 6:53	60.138	0.02
4/15/98 8:57	60.32	-0.055	4/15/98 6:57	60.121	-0.03
4/15/98 9:01	60.297	0.095	4/15/98 7:01	60.111	0.12
4/15/98 9:05	60.313	0.015	4/15/98 7:05	60.142	-0.09
4/15/98 9:09	60.309	0.15	4/15/98 7:09	60.115	0.005
4/15/98 9:13	60.316	-0.06	4/15/98 7:13	60.135	-0.085
4/15/98 9:17	60.316	0.035	4/15/98 7:17	60.124	-0.085
4/15/98 9:21	60.339	0.09	4/15/98 7:21	60.116	-0.115
4/15/98 9:25	60.304	0.14	4/15/98 7:25	60.118	-0.14
4/15/98 9:29	60.323	-0.025	4/15/98 7:29	60.107	-0.125
4/15/98 9:33	60.357	-0.18	4/15/98 7:33	60.093	-0.095
4/15/98 9:37	60.332	-0.04	4/15/98 7:37	60.09	0.09
4/15/98 9:41	60.318	0.085	4/15/98 7:41	60.082	0.01
4/15/98 9:45	60.321	-1.73	4/15/98 7:45	60.074	0.12
4/15/98 9:49	60.324	-6.915	4/15/98 7:49	60.108	-0.055
4/15/98 9:53	60.335	-13.43	4/15/98 7:53	60.084	0.025
4/15/98 9:57	59.975	-19.76	4/15/98 7:57	60.098	-0.105

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4/15/98 10:01	58.941	-18.49	4/15/98 8:01	60.097	-0.205
4/15/98 10:05	57.649	-14.82	4/15/98 8:05	60.089	-0.085
4/15/98 10:09	56.023	-8.9	4/15/98 8:09	60.077	0.13
4/15/98 10:13	55.243	-6.9	4/15/98 8:13	60.056	0.225
4/15/98 10:17	54.685	-5.815	4/15/98 8:17	60.072	0.175
4/15/98 10:21	54.243	-5.02	4/15/98 8:21	60.103	-0.12
4/15/98 10:25	53.863	-4.43	4/15/98 8:25	60.101	-0.04
4/15/98 10:29	53.522	-4.145	4/15/98 8:29	60.107	-0.095
4/15/98 10:33	53.239	-3.97	4/15/98 8:33	60.079	0.08
4/15/98 10:37	52.977	-3.9	4/15/98 8:37	60.093	0.01
4/15/98 10:41	52.693	-3.525	4/15/98 8:41	60.088	0.02
4/15/98 10:45	52.445	-3.43	4/15/98 8:45	60.095	0.06
4/15/98 10:49	52.197	-6.08	4/15/98 8:49	60.095	0.045
4/15/98 10:53	51.988	-6.495	4/15/98 8:53	60.092	-0.055
4/15/98 10:57	51.759	-6.885	4/15/98 8:57	60.107	0.045
4/15/98 11:01	50.981	-4.535	4/15/98 9:01	60.104	-0.1
4/15/98 11:05	50.689	-3.02	4/15/98 9:05	60.081	0.115
4/15/98 11:09	50.382	-1.315	4/15/98 9:09	60.116	-0.14
4/15/98 11:13	50.074	0.1	4/15/98 9:13	60.084	-0.06
4/15/98 11:17	50.085	1.22	4/15/98 9:17	60.104	-0.16
4/15/98 11:21	50.119	-1.945	4/15/98 9:21	60.088	-0.105
4/15/98 11:25	50.094	-7.385	4/15/98 9:25	60.072	-0.055
4/15/98 11:29	50.329	-30.245	4/15/98 9:29	60.072	0.17
4/15/98 11:33	49.73	-32.42	4/15/98 9:33	60.067	0.015
4/15/98 11:37	48.617	-26.845	4/15/98 9:37	60.061	0.06
4/15/98 11:41	44.28	-8.65	4/15/98 9:41	60.106	-0.21
4/15/98 11:45	43.246	-4.475	4/15/98 9:45	60.07	-2.505
4/15/98 11:49	43.248	-8.795	4/15/98 9:49	60.073	-8.665
4/15/98 11:53	42.55	-13.185	4/15/98 9:53	60.064	-16.835
4/15/98 11:57	42.351	-20.535	4/15/98 9:57	59.569	-23.675
4/15/98 12:01	41.489	-25.305	4/15/98 10:01	58.34	-26.815
4/15/98 12:05	39.913	-26.675	4/15/98 10:05	56.697	-27.685
4/15/98 12:09	38.244	-27.78	4/15/98 10:09	54.834	-27.88
4/15/98 12:13	36.428	-28.385	4/15/98 10:13	52.977	-28.02
4/15/98 12:17	34.578	-28.865	4/15/98 10:17	51.16	-26.11
4/15/98 12:21	32.688	-29.075	4/15/98 10:21	49.258	-23.2
4/15/98 12:25	30.751	-25.07	4/15/98 10:25	47.373	-16
4/15/98 12:29	28.805	-23.4	4/15/98 10:29	45.938	-9.77
4/15/98 12:33	26.873	-17.305	4/15/98 10:33	44.618	-3.735
4/15/98 12:37	25.737	-13.275	4/15/98 10:37	44.173	-4.265
4/15/98 12:41	24.125	-6.97	4/15/98 10:41	43.984	-5.38
4/15/98 12:45	23.412	-4.67	4/15/98 10:45	43.871	-5.18
4/15/98 12:49	23.082	-3.655	4/15/98 10:49	43.32	-7.985
4/15/98 12:53	22.731	-2.125	4/15/98 10:53	42.908	-14.02
4/15/98 12:57	22.478	-0.98	4/15/98 10:57	42.835	-22.46
4/15/98 13:01	22.351	-0.325	4/15/98 11:01	41.723	-25.94
4/15/98 13:05	22.306	-0.305	4/15/98 11:05	40.104	-22.54
4/15/98 13:09	22.282	0.04	4/15/98 11:09	38.343	-22.68
4/15/98 13:13	22.286	-0.29	4/15/98 11:13	36.535	-16.92

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4/15/98 13:17	22.245	0.02	4/15/98 11:17	35.596	-13.76
4/15/98 13:21	22.29	-0.29	4/15/98 11:21	33.807	-5.47
4/15/98 13:25	22.228	3.055	4/15/98 11:25	33.151	-2.64
4/15/98 13:29	22.249	2.655	4/15/98 11:29	32.844	-6.185
4/15/98 13:33	22.232	2.26	4/15/98 11:33	32.713	-13.28
4/15/98 13:37	22.839	-1.17	4/15/98 11:37	32.623	-21.225
4/15/98 13:41	22.78	2.045	4/15/98 11:41	31.607	-25.505
4/15/98 13:45	22.684	3.645	4/15/98 11:45	30.057	-22.6
4/15/98 13:49	22.605	4.315	4/15/98 11:49	28.378	-23.22
4/15/98 13:53	23.189	-10.37	4/15/98 11:53	26.506	-17.765
4/15/98 13:57	23.413	-21.73	4/15/98 11:57	25.537	-14.585
4/15/98 14:01	23.468	-32.355	4/15/98 12:01	23.734	-6.405
4/15/98 14:05	21.115	-30.215	4/15/98 12:05	22.953	-2.955
4/15/98 14:09	19.067	-26.855	4/15/98 12:09	22.62	-1.5
4/15/98 14:13	16.997	-19.18	4/15/98 12:13	22.453	-0.77
4/15/98 14:17	15.072	-17.86	4/15/98 12:17	22.362	-0.315
4/15/98 14:21	13.696	-19.7185	4/15/98 12:21	22.32	-0.21
4/15/98 14:25	13.161	-26.3835	4/15/98 12:25	22.299	-0.01
4/15/98 14:29	11.5	-27.348	4/15/98 12:29	22.299	0
4/15/98 14:33	9.7523	-27.8275	4/15/98 12:33	22.278	0.065
4/15/98 14:37	7.8843	-27.831	4/15/98 12:37	22.297	-0.23
4/15/98 14:41	6.0304	-28.0332	4/15/98 12:41	22.299	-0.13
4/15/98 14:45	4.1868	-28.128	4/15/98 12:45	22.291	0
4/15/98 14:49	2.3181	-28.227	4/15/98 12:49	22.251	0.085
4/15/98 14:53	0.42377	-28.2114	4/15/98 12:53	22.273	0.06
4/15/98 14:57	-1.4388	-25.5465	4/15/98 12:57	22.291	0.06
4/15/98 15:01	-3.3273	-26.221	4/15/98 13:01	22.268	0.195
4/15/98 15:05	-5.2185	-27.6025	4/15/98 13:05	22.285	-0.1
4/15/98 15:09	-6.5481	-30.9845	4/15/98 13:09	22.303	-0.065
4/15/98 15:13	-8.5715	-30.5875	4/15/98 13:13	22.307	-0.085
4/15/98 15:17	-10.739	-29.56	4/15/98 13:17	22.265	0.13
4/15/98 15:21	-12.745	-29.04	4/15/98 13:21	22.29	-0.29
4/15/98 15:25	-14.689	-27.52	4/15/98 13:25	22.29	-2.04
4/15/98 15:29	-16.651	-24.295	4/15/98 13:29	22.291	-4.73
4/15/98 15:33	-18.553	-22.84	4/15/98 13:33	22.232	-5.645
4/15/98 15:37	-20.193	-20.71	4/15/98 13:37	21.882	-4.4
4/15/98 15:41	-21.51	-17.91	4/15/98 13:41	21.345	-1.39
4/15/98 15:45	-23.121	-24.03	4/15/98 13:45	21.103	0.11
4/15/98 15:49	-24.335	-22.62	4/15/98 13:49	21.002	-4.635
4/15/98 15:53	-25.092	-21.14	4/15/98 13:53	21.067	-13.03
4/15/98 15:57	-27.927	-8.825	4/15/98 13:57	21.125	-21.94
4/15/98 16:01	-28.859	-3.775	4/15/98 14:01	20.075	-26.035
4/15/98 16:05	-29.32	-1.53	4/15/98 14:05	18.461	-22.755
4/15/98 16:09	-29.692	0.575	4/15/98 14:09	16.737	-23.27
4/15/98 16:13	-29.614	0.075	4/15/98 14:13	14.868	-20.76
4/15/98 16:17	-29.626	0.09	4/15/98 14:17	13.91	-25.0695
4/15/98 16:21	-29.577	-0.08	4/15/98 14:21	12.083	-25.474
4/15/98 16:25	-29.599	-0.255	4/15/98 14:25	10.716	-28.145
4/15/98 16:29	-29.608	-0.225	4/15/98 14:29	8.8961	-28.2645

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4/15/98 16:33	-29.593	-0.2	4/15/98 14:33	6.9882	-28.2195
4/15/98 16:37	-29.65	0.045	4/15/98 14:37	5.087	-27.7899
4/15/98 16:41	-29.653	0.02	4/15/98 14:41	3.2432	-27.9935
4/15/98 16:45	-29.633	-0.215	4/15/98 14:45	1.3443	-28.2025
4/15/98 16:49	-29.641	-0.12	4/15/98 14:49	-0.47097	-29.0747
4/15/98 16:53	-29.649	-0.145	4/15/98 14:53	-2.3555	-28.6175
4/15/98 16:57	-29.676	-0.075	4/15/98 14:57	-4.2962	-28.399
4/15/98 17:01	-29.665	-0.1	4/15/98 15:01	-6.2859	-27.9755
4/15/98 17:05	-29.678	-0.025	4/15/98 15:05	-8.079	-28.69
4/15/98 17:09	-29.691	-0.07	4/15/98 15:09	-9.976	-29.315
4/15/98 17:13	-29.685	-0.3	4/15/98 15:13	-11.881	-29.24
4/15/98 17:17	-29.683	-0.155	4/15/98 15:17	-13.817	-28.755
4/15/98 17:21	-29.705	0.07	4/15/98 15:21	-15.839	-28.455
4/15/98 17:25	-29.745	0.39	4/15/98 15:25	-17.729	-28.65
4/15/98 17:29	-29.714	0.265	4/15/98 15:29	-19.568	-29.22
4/15/98 17:33	-29.691	0.08	4/15/98 15:33	-21.53	-23.59
4/15/98 17:37	-29.667	0.01	4/15/98 15:37	-23.459	-22.63
4/15/98 17:41	-29.661	-0.065	4/15/98 15:41	-25.412	-19.025
4/15/98 17:45	-29.675	0.055	4/15/98 15:45	-26.248	-16.94
4/15/98 17:49	-29.665	-0.23	4/15/98 15:49	-27.985	-9.175
4/15/98 17:53	-29.674	-0.01	4/15/98 15:53	-29.217	-3.45
4/15/98 17:57	-29.664	-0.025	4/15/98 15:57	-29.636	-2.395
4/15/98 18:01	-29.711	0.035	4/15/98 16:01	-29.82	-0.965
4/15/98 18:05	-29.676	0.01	4/15/98 16:05	-29.907	-0.47
4/15/98 18:09	-29.669	-0.09	4/15/98 16:09	-30.115	0.46
4/15/98 18:13	-29.704	-0.02	4/15/98 16:13	-30.013	0.43
4/15/98 18:17	-29.674	-0.17	4/15/98 16:17	-30.001	0.325
4/15/98 18:21	-29.687	0.03	4/15/98 16:21	-30.023	0.51
4/15/98 18:25	-29.708	0.15	4/15/98 16:25	-29.927	0.095
4/15/98 18:29	-29.708	-1.105	4/15/98 16:29	-29.936	0.125
4/15/98 18:33	-29.681	-0.385	4/15/98 16:33	-29.921	0.035
4/15/98 18:37	-29.678	-0.09	4/15/98 16:37	-29.908	-0.07
4/15/98 18:41	-29.929	1.475	4/15/98 16:41	-29.911	-0.095
4/15/98 18:45	-29.758	0.715	4/15/98 16:45	-29.914	-0.22
4/15/98 18:49	-29.696	0.41	4/15/98 16:49	-29.922	0.23
4/15/98 18:53	-29.634	0.12	4/15/98 16:53	-29.93	0.085
4/15/98 18:57	-29.615	-0.05	4/15/98 16:57	-29.958	0.165
4/15/98 19:01	-29.614	0.345	4/15/98 17:01	-29.876	-0.335
4/15/98 19:05	-29.61	0.035	4/15/98 17:05	-29.913	-0.025
4/15/98 19:09	-29.625	0.295	4/15/98 17:09	-29.925	0.045
4/15/98 19:13	-29.545	-0.18	4/15/98 17:13	-29.943	-0.185
4/15/98 19:17	-29.603	0.175	4/15/98 17:17	-29.918	-0.035
4/15/98 19:21	-29.566	-0.08	4/15/98 17:21	-29.916	-0.165
4/15/98 19:25	-29.581	-0.08	4/15/98 17:25	-29.98	0.395
4/15/98 19:29	-29.568	-0.24	4/15/98 17:29	-29.925	-0.09
4/15/98 19:33	-29.582	-0.265	4/15/98 17:33	-29.949	0.08
4/15/98 19:37	-29.597	-0.19	4/15/98 17:37	-29.901	-0.11
4/15/98 19:41	-29.616	-0.8	4/15/98 17:41	-29.943	-0.065
4/15/98 19:45	-29.635	-0.14	4/15/98 17:45	-29.933	0.055

4/15/98 19:49	-29.635	-0.065	4/15/98 17:49	-29.923	-0.23
4/15/98 19:53	-29.776	0.615	4/15/98 17:53	-29.956	-0.005
4/15/98 19:57	-29.663	6.14	4/15/98 17:57	-29.922	-0.14
4/15/98 20:01	-29.648	15.28	4/15/98 18:01	-29.969	0.035
4/15/98 20:05	-29.653	24.5	4/15/98 18:05	-29.957	-0.11
4/15/98 20:09	-28.435	27.905	4/15/98 18:09	-29.95	-0.09
4/15/98 20:13	-26.592	28.05	4/15/98 18:13	-29.962	-0.02
4/15/98 20:17	-24.753	28.42	4/15/98 18:17	-29.979	-0.05
4/15/98 20:21	-22.854	28.2	4/15/98 18:21	-29.968	0.025
4/15/98 20:25	-20.982	28.545	4/15/98 18:25	-29.966	-0.205
4/15/98 20:29	-19.069	28.28	4/15/98 18:29	-29.989	-1.345
4/15/98 20:33	-17.214	28.4	4/15/98 18:33	-29.963	-0.735
4/15/98 20:37	-15.273	28.0035	4/15/98 18:37	-30.007	-0.325
4/15/98 20:41	-13.413	28.1945	4/15/98 18:41	-30.258	1.245
4/15/98 20:45	-11.534	28.241	4/15/98 18:45	-30.11	0.715
4/15/98 20:49	-9.6723	28.319	4/15/98 18:49	-30.072	0.645
4/15/98 20:53	-7.7741	28.2065	4/15/98 18:53	-30.009	0.235
4/15/98 20:57	-5.8858	28.20915	4/15/98 18:57	-29.967	-0.165
4/15/98 21:01	-4.0085	28.3125	4/15/98 19:01	-29.943	-0.24
4/15/98 21:05	-2.1328	28.3815	4/15/98 19:05	-29.962	0.27
4/15/98 21:09	-0.24397	28.47085	4/15/98 19:09	-30	0.295
4/15/98 21:13	1.654	28.366	4/15/98 19:13	-29.991	-0.06
4/15/98 21:17	3.5435	28.3905	4/15/98 19:17	-29.908	0.06
4/15/98 21:21	5.4502	28.374	4/15/98 19:21	-29.941	0.035
4/15/98 21:25	7.3272	28.489	4/15/98 19:25	-30.003	0.27
4/15/98 21:29	9.2216	28.372	4/15/98 19:29	-29.896	-0.125
4/15/98 21:33	11.125	28.4	4/15/98 19:33	-29.934	-0.03
4/15/98 21:37	13.025	28.385	4/15/98 19:37	-29.949	0.045
4/15/98 21:41	14.896	28.48	4/15/98 19:41	-29.921	-0.8
4/15/98 21:45	16.805	27.705	4/15/98 19:45	-29.94	-0.495
4/15/98 21:49	18.702	22.265	4/15/98 19:49	-29.94	0.05
4/15/98 21:53	20.592	13.46	4/15/98 19:53	-30.081	0.85
4/15/98 21:57	22.346	5.755	4/15/98 19:57	-30.039	7.435
4/15/98 22:01	23.155	1.835	4/15/98 20:01	-29.93	16.225
4/15/98 22:05	23.284	-1.815	4/15/98 20:05	-29.911	25.67
4/15/98 22:09	23.497	-3.4	4/15/98 20:09	-28.552	28.145
4/15/98 22:13	23.522	-3.94	4/15/98 20:13	-26.685	28.17
4/15/98 22:17	22.921	-0.99	4/15/98 20:17	-24.777	28.315
4/15/98 22:21	22.817	-0.56	4/15/98 20:21	-22.923	28.545
4/15/98 22:25	22.734	-0.145	4/15/98 20:25	-21.051	28.665
4/15/98 22:29	22.723	2.77	4/15/98 20:29	-19.114	28.055
4/15/98 22:33	22.705	10.105	4/15/98 20:33	-17.214	28.175
4/15/98 22:37	22.705	18.38	4/15/98 20:37	-15.318	28.2285
4/15/98 22:41	23.277	24.695	4/15/98 20:41	-13.503	28.6445
4/15/98 22:45	24.726	26.505	4/15/98 20:45	-11.579	28.466
4/15/98 22:49	26.381	27.545	4/15/98 20:49	-9.6723	28.4295
4/15/98 22:53	28.216	27.625	4/15/98 20:53	-7.7741	28.5355
4/15/98 22:57	30.027	28.015	4/15/98 20:57	-5.8858	28.64605
4/15/98 23:01	31.89	28.095	4/15/98 21:01	-3.9864	28.528

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4/15/98 23:05	33.741	28.3	4/15/98 21:05	-2.067	28.5935
4/15/98 23:09	35.63	28.305	4/15/98 21:09	-0.15659	28.46495
4/15/98 23:13	37.509	28.39	4/15/98 21:13	1.7192	28.4695
4/15/98 23:17	39.401	28.3	4/15/98 21:17	3.6517	28.491
4/15/98 23:21	41.291	28.27	4/15/98 21:21	5.5364	28.583
4/15/98 23:25	43.187	28.3	4/15/98 21:25	7.4131	28.5895
4/15/98 23:29	45.061	28.375	4/15/98 21:29	9.3499	28.4705
4/15/98 23:33	46.945	28.35	4/15/98 21:33	11.253	28.495
4/15/98 23:37	48.847	28.03	4/15/98 21:37	13.131	28.485
4/15/98 23:41	50.736	27.445	4/15/98 21:41	15.044	28.68
4/15/98 23:45	52.615	26.425	4/15/98 21:45	16.952	27.175
4/15/98 23:49	54.453	22.975	4/15/98 21:49	18.828	19.455
4/15/98 23:53	56.225	17.045	4/15/98 21:53	20.78	10.965
4/15/98 23:57	57.9	10.19	4/15/98 21:57	22.387	3.475
4/16/98 0:01	59.048	5.205	4/15/98 22:01	22.719	2.15
4/16/98 0:05	59.634	2.66	4/15/98 22:05	22.973	1.09
4/16/98 0:09	59.938	1.33	4/15/98 22:09	23.082	0.545
4/16/98 0:13	60.089	0.705	4/15/98 22:13	23.149	0.21
4/16/98 0:17	60.166	0.355	4/15/98 22:17	23.191	0.15
4/16/98 0:21	60.204	0.26	4/15/98 22:21	23.191	-0.04
4/16/98 0:25	60.23	0.225	4/15/98 22:25	23.191	0.27
4/16/98 0:29	60.237	0.27	4/15/98 22:29	23.221	4.325
4/16/98 0:33	60.256	0.06	4/15/98 22:33	23.183	12.055
4/16/98 0:37	60.275	0.165	4/15/98 22:37	23.245	20.42
4/16/98 0:41	60.291	-0.035	4/15/98 22:41	24.086	25.37
4/16/98 0:45	60.268	0.07	4/15/98 22:45	25.594	27.175
4/16/98 0:49	60.308	-0.11	4/15/98 22:49	27.329	27.895
4/16/98 0:53	60.284	-0.17	4/15/98 22:53	29.16	28.185
4/16/98 0:57	60.282	-0.135	4/15/98 22:57	31.029	28.265
4/16/98 1:01	60.286	0.06	4/15/98 23:01	32.908	28.345
4/16/98 1:05	60.25	0.25	4/15/98 23:05	34.797	28.335
4/16/98 1:09	60.255	0.11	4/15/98 23:09	36.682	28.54
4/16/98 1:13	60.298	-0.125	4/15/98 23:13	38.577	28.53
4/16/98 1:17	60.3	-0.155	4/15/98 23:17	40.464	28.645
4/16/98 1:21	60.277	0.055	4/15/98 23:21	42.39	28.41
4/16/98 1:25	60.273	-0.005	4/15/98 23:25	44.283	28.435
4/16/98 1:29	60.269	0.015	4/15/98 23:29	46.193	28.51
4/16/98 1:33	60.288	0.11	4/15/98 23:33	48.072	28.685
4/16/98 1:37	60.272	0.115	4/15/98 23:37	49.97	28.85
4/16/98 1:41	60.272	0.015	4/15/98 23:41	51.895	26.8
4/16/98 1:45	60.31	-0.19	4/15/98 23:45	53.809	24.82
4/16/98 1:49	60.295	-0.02	4/15/98 23:49	55.74	18.38
4/16/98 1:53	60.275	-0.06	4/15/98 23:53	57.255	12.375
4/16/98 1:57	60.272	-0.04	4/15/98 23:57	58.773	5.345
4/16/98 2:01	60.291	-0.205	4/16/98 0:01	59.416	2.495
4/16/98 2:05	60.263	0.03	4/16/98 0:05	59.73	1.02
4/16/98 2:09	60.264	0.125	4/16/98 0:09	59.842	0.65
4/16/98 2:13	60.25	0.18	4/16/98 0:13	59.915	0.32
4/16/98 2:17	60.269	0.085	4/16/98 0:17	59.934	0.26

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4/16/98 2:21	60.289	-0.09	4/16/98 0:21	59.972	0.07
4/16/98 2:25	60.286	0.02	4/16/98 0:25	59.979	0.035
4/16/98 2:29	60.286	0.02	4/16/98 0:29	59.986	-0.02
4/16/98 2:33	60.271	0.22	4/16/98 0:33	59.986	0.155
4/16/98 2:37	60.29	-0.095	4/16/98 0:37	59.986	0.16
4/16/98 2:41	60.29	-0.1	4/16/98 0:41	59.982	0.06
4/16/98 2:45	60.315	-0.13	4/16/98 0:45	60.017	-0.03
4/16/98 2:49	60.271	0.105	4/16/98 0:49	60.018	0.08
4/16/98 2:53	60.27	0.205	4/16/98 0:53	59.994	0.025
4/16/98 2:57	60.289	0.13	4/16/98 0:57	60.011	-0.035
4/16/98 3:01	60.292	-0.01	4/16/98 1:01	60.034	-0.13
4/16/98 3:05	60.311	-0.1	4/16/98 1:05	59.999	-0.04
4/16/98 3:09	60.315	-0.255	4/16/98 1:09	60.004	0.11
4/16/98 3:13	60.29	-0.12	4/16/98 1:13	60.008	-0.03
4/16/98 3:17	60.291	-0.215	4/16/98 1:17	59.991	0.135
4/16/98 3:21	60.264	0.12	4/16/98 1:21	60.026	-0.14
4/16/98 3:25	60.266	0.29	4/16/98 1:25	60.002	0
4/16/98 3:29	60.248	0.265	4/16/98 1:29	60.018	0.015
4/16/98 3:33	60.288	-0.02	4/16/98 1:33	59.998	0.015
4/16/98 3:37	60.324	-0.085	4/16/98 1:37	60.002	0.11
4/16/98 3:41	60.301	-0.095	4/16/98 1:41	60.021	-0.08
4/16/98 3:45	60.284	-0.015	4/16/98 1:45	60.001	0
4/16/98 3:49	60.307	-0.06	4/16/98 1:49	60.024	-0.115
4/16/98 3:53	60.282	-0.05	4/16/98 1:53	60.005	-0.06
4/16/98 3:57	60.281	0.055	4/16/98 1:57	60.001	0.06
4/16/98 4:01	60.295	-0.08	4/16/98 2:01	60.001	-0.015
4/16/98 4:05	60.272	-5.495	4/16/98 2:05	59.993	0.03
4/16/98 4:09	60.292	-14.64	4/16/98 2:09	60.013	-0.07
4/16/98 4:13	60.279	-24.015	4/16/98 2:13	59.998	0.09
4/16/98 4:17	59.173	-27.96	4/16/98 2:17	59.999	0.085
4/16/98 4:21	57.364	-28.62	4/16/98 2:21	59.999	0.005
4/16/98 4:25	55.476	-28.75	4/16/98 2:25	60.016	-0.08
4/16/98 4:29	53.581	-29.025	4/16/98 2:29	60.016	-0.175
4/16/98 4:33	51.64	-28.89	4/16/98 2:33	60	0.03
4/16/98 4:37	49.726	-28.82	4/16/98 2:37	60	0.005
4/16/98 4:41	47.776	-28.605	4/16/98 2:41	59.981	0.095
4/16/98 4:45	45.862	-28.505	4/16/98 2:45	60.006	-0.13
4/16/98 4:49	43.962	-28.49	4/16/98 2:49	60.001	0.105
4/16/98 4:53	42.055	-28.54	4/16/98 2:53	60	0.01
4/16/98 4:57	40.161	-28.685	4/16/98 2:57	59.98	0.125
4/16/98 5:01	38.264	-28.755	4/16/98 3:01	60.022	-0.205
4/16/98 5:05	36.347	-28.76	4/16/98 3:05	60.002	-0.005
4/16/98 5:09	34.424	-28.69	4/16/98 3:09	60.005	-0.055
4/16/98 5:13	32.513	-28.735	4/16/98 3:13	59.981	0.075
4/16/98 5:17	30.595	-28.655	4/16/98 3:17	60.001	-0.02
4/16/98 5:21	28.686	-28.755	4/16/98 3:21	59.994	0.02
4/16/98 5:25	26.766	-28.71	4/16/98 3:25	59.996	-0.005
4/16/98 5:29	24.864	-28.835	4/16/98 3:29	59.997	-0.025
4/16/98 5:33	22.935	-28.67	4/16/98 3:33	59.998	-0.02

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4/16/98 5:37	21.024	-28.635	4/16/98 3:37	59.995	0.11
4/16/98 5:41	19.097	-28.58	4/16/98 3:41	59.992	0
4/16/98 5:45	17.201	-28.615	4/16/98 3:45	59.994	0.08
4/16/98 5:49	15.297	-28.639	4/16/98 3:49	60.017	-0.25
4/16/98 5:53	13.381	-28.6245	4/16/98 3:53	59.992	0.045
4/16/98 5:57	11.478	-28.6295	4/16/98 3:57	60.01	-0.04
4/16/98 6:01	9.5692	-28.6665	4/16/98 4:01	59.967	0.305
4/16/98 6:05	7.6561	-28.5675	4/16/98 4:05	60.001	-4.43
4/16/98 6:09	5.7521	-28.5081	4/16/98 4:09	60.002	-13.285
4/16/98 6:13	3.8359	-28.5525	4/16/98 4:13	60.028	-23.15
4/16/98 6:17	1.9426	-28.6425	4/16/98 4:17	59.115	-28.55
4/16/98 6:21	0.050474	-28.6004	4/16/98 4:21	57.345	-29.41
4/16/98 6:25	-1.8746	-28.538	4/16/98 4:25	55.398	-29.345
4/16/98 6:29	-3.7859	-28.5515	4/16/98 4:29	53.405	-28.84
4/16/98 6:33	-5.6696	-28.632	4/16/98 4:33	51.463	-28.6
4/16/98 6:37	-7.5822	-28.499	4/16/98 4:37	49.529	-28.435
4/16/98 6:41	-9.4962	-28.469	4/16/98 4:41	47.637	-28.51
4/16/98 6:45	-11.396	-28.69	4/16/98 4:45	45.743	-28.715
4/16/98 6:49	-13.282	-28.7	4/16/98 4:49	43.842	-28.695
4/16/98 6:53	-15.19	-28.74	4/16/98 4:53	41.935	-28.85
4/16/98 6:57	-17.134	-28.785	4/16/98 4:57	40	-28.595
4/16/98 7:01	-19.022	-28.7	4/16/98 5:01	38.103	-28.765
4/16/98 7:05	-20.938	-28.675	4/16/98 5:05	36.165	-28.465
4/16/98 7:09	-22.891	-19.175	4/16/98 5:09	34.281	-28.59
4/16/98 7:13	-24.762	-21.74	4/16/98 5:13	32.35	-28.64
4/16/98 7:17	-26.673	-16.295	4/16/98 5:17	30.472	-28.765
4/16/98 7:21	-26.726	-18.035	4/16/98 5:21	28.563	-28.76
4/16/98 7:25	-29.11	-7.015	4/16/98 5:25	26.622	-28.615
4/16/98 7:29	-29.932	-3.39	4/16/98 5:29	24.719	-28.635
4/16/98 7:33	-30.333	-1.69	4/16/98 5:33	22.811	-28.785
4/16/98 7:37	-30.513	-0.82	4/16/98 5:37	20.899	-28.75
4/16/98 7:41	-30.61	-0.56	4/16/98 5:41	18.992	-28.69
4/16/98 7:45	-30.671	-0.01	4/16/98 5:45	17.054	-28.625
4/16/98 7:49	-30.677	1.54	4/16/98 5:49	15.149	-28.54
4/16/98 7:53	-30.722	3.28	4/16/98 5:53	13.254	-28.9555
4/16/98 7:57	-30.673	2.575	4/16/98 5:57	11.329	-28.962
4/16/98 8:01	-30.369	-0.325	4/16/98 6:01	9.441	-29.108
4/16/98 8:05	-30.066	-2.45	4/16/98 6:05	7.4629	-28.6885
4/16/98 8:09	-30.158	-2.32	4/16/98 6:09	5.5366	-28.741
4/16/98 8:13	-30.434	-0.85	4/16/98 6:13	3.6194	-28.457
4/16/98 8:17	-30.556	-0.27	4/16/98 6:17	1.7252	-28.7675
4/16/98 8:21	-30.622	0.095	4/16/98 6:21	-0.2116	-28.618
4/16/98 8:25	-30.604	-0.22	4/16/98 6:25	-2.072	-28.996
4/16/98 8:29	-30.61	-0.175	4/16/98 6:29	-4.0283	-28.791
4/16/98 8:33	-30.603	-0.06	4/16/98 6:33	-5.9352	-28.649
4/16/98 8:37	-30.648	0.34	4/16/98 6:37	-7.8712	-28.519
4/16/98 8:41	-30.645	0.36	4/16/98 6:41	-9.7865	-28.4875
4/16/98 8:45	-30.615	0.16	4/16/98 6:45	-11.665	-28.48
4/16/98 8:49	-30.58	-0.13	4/16/98 6:49	-13.575	-28.495

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4/16/98 8:53	-30.573	-0.18	4/16/98 6:53	-15.484	-28.535
4/16/98 8:57	-30.583	-0.185	4/16/98 6:57	-17.361	-28.8
4/16/98 9:01	-30.606	-0.1	4/16/98 7:01	-19.274	-28.6
4/16/98 9:05	-30.609	-0.025	4/16/98 7:05	-21.191	-28.575
4/16/98 9:09	-30.62	-0.165	4/16/98 7:09	-23.121	-20.59
4/16/98 9:13	-30.626	-0.18	4/16/98 7:13	-24.994	-22.57
4/16/98 9:17	-30.614	-0.345	4/16/98 7:17	-26.906	-16.89
4/16/98 9:21	-30.653	-0.155	4/16/98 7:21	-27.239	-17.23
4/16/98 9:25	-30.662	0.1	4/16/98 7:25	-29.508	-6.67
4/16/98 9:29	-30.683	0.04	4/16/98 7:29	-30.284	-3.395
4/16/98 9:33	-30.684	0.115	4/16/98 7:33	-30.685	-1.46
4/16/98 9:37	-30.642	-0.02	4/16/98 7:37	-30.842	-0.59
4/16/98 9:41	-30.675	-0.02	4/16/98 7:41	-30.963	-0.09
4/16/98 9:45	-30.661	-0.11	4/16/98 7:45	-30.977	0.11
4/16/98 9:49	-30.646	0.005	4/16/98 7:49	-30.96	2.25
4/16/98 9:53	-30.679	-0.325	4/16/98 7:53	-30.981	3.4
4/16/98 9:57	-30.683	0.005	4/16/98 7:57	-30.955	2.34
4/16/98 10:01	-30.645	-0.09	4/16/98 8:01	-30.51	-0.915
4/16/98 10:05	-30.744	0.385	4/16/98 8:05	-30.301	-2.565
4/16/98 10:09	-30.682	-1.155	4/16/98 8:09	-30.487	-1.965
4/16/98 10:13	-30.663	-0.355	4/16/98 8:13	-30.693	-1.085
4/16/98 10:17	-30.667	0.035	4/16/98 8:17	-30.814	-0.395
4/16/98 10:21	-30.913	1.2	4/16/98 8:21	-30.88	-0.265
4/16/98 10:25	-30.734	0.495	4/16/98 8:25	-30.91	0.255
4/16/98 10:29	-30.66	-0.145	4/16/98 8:29	-30.893	0.065
4/16/98 10:33	-30.673	0.3	4/16/98 8:33	-30.933	0.3
4/16/98 10:37	-30.635	0.15	4/16/98 8:37	-30.859	-0.25
4/16/98 10:41	-30.689	0.345	4/16/98 8:41	-30.88	-0.11
4/16/98 10:45	-30.613	0.005	4/16/98 8:45	-30.873	-0.2
4/16/98 10:49	-30.605	0.005	4/16/98 8:49	-30.909	0.105
4/16/98 10:53	-30.62	0.005	4/16/98 8:53	-30.902	0.055
4/16/98 10:57	-30.612	-0.025	4/16/98 8:57	-30.913	0.055
4/16/98 11:01	-30.604	-0.155	4/16/98 9:01	-30.888	0.015
4/16/98 11:05	-30.619	0.05	4/16/98 9:05	-30.891	-0.025
4/16/98 11:09	-30.617	-0.09	4/16/98 9:09	-30.902	-0.165
4/16/98 11:13	-30.635	-0.17	4/16/98 9:13	-30.885	-0.18
4/16/98 11:17	-30.609	-0.26	4/16/98 9:17	-30.896	-0.11
4/16/98 11:21	-30.635	-0.085	4/16/98 9:21	-30.935	-0.04
4/16/98 11:25	-30.669	-1.54	4/16/98 9:25	-30.921	-0.135
4/16/98 11:29	-30.661	2.435	4/16/98 9:29	-30.918	-0.08
4/16/98 11:33	-30.652	8.625	4/16/98 9:33	-30.943	0
4/16/98 11:37	-30.977	18.565	4/16/98 9:37	-30.948	-0.14
4/16/98 11:41	-30.174	23.57	4/16/98 9:41	-30.934	-0.02
4/16/98 11:45	-28.927	26.57	4/16/98 9:45	-30.943	-0.115
4/16/98 11:49	-27.264	29.675	4/16/98 9:49	-30.976	0.125
4/16/98 11:53	-25.46	28.32	4/16/98 9:53	-30.938	-0.325
4/16/98 11:57	-23.613	21.015	4/16/98 9:57	-30.966	0.01
4/16/98 12:01	-21.329	11.525	4/16/98 10:01	-30.951	-0.09
4/16/98 12:05	-19.796	10.35	4/16/98 10:05	-31.003	-0.085

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4/16/98 12:09	-19.41	16.365	4/16/98 10:09	-30.964	-0.57
4/16/98 12:13	-19.024	23.385	4/16/98 10:13	-30.969	0.12
4/16/98 12:17	-17.726	26.505	4/16/98 10:17	-31.02	0.385
4/16/98 12:21	-16.137	29.89	4/16/98 10:21	-31.078	0.73
4/16/98 12:25	-14.347	24.332	4/16/98 10:25	-30.945	0.37
4/16/98 12:29	-12.425	16.401	4/16/98 10:29	-30.943	0.21
4/16/98 12:33	-10.159	5.7465	4/16/98 10:33	-30.932	0.18
4/16/98 12:37	-9.4806	2.363	4/16/98 10:37	-30.871	-0.2
4/16/98 12:41	-9.1448	0.7215	4/16/98 10:41	-30.901	-0.005
4/16/98 12:45	-9.0097	0.8085	4/16/98 10:45	-30.896	0.125
4/16/98 12:49	-9.008	6.593	4/16/98 10:49	-30.911	0.12
4/16/98 12:53	-9.0005	14.308	4/16/98 10:53	-30.902	-0.115
4/16/98 12:57	-8.848	22.1745	4/16/98 10:57	-30.871	-0.26
4/16/98 13:01	-7.6894	25.4165	4/16/98 11:01	-30.887	-0.385
4/16/98 13:05	-6.1389	29.04645	4/16/98 11:05	-30.925	0.05
4/16/98 13:09	-4.4131	25.25025	4/16/98 11:09	-30.923	-0.205
4/16/98 13:13	-2.6061	20.8205	4/16/98 11:13	-30.964	-0.055
4/16/98 13:17	-0.32961	17.83055	4/16/98 11:17	-30.915	-0.14
4/16/98 13:21	0.63695	21.79025	4/16/98 11:21	-30.964	-0.085
4/16/98 13:25	1.558	26.051	4/16/98 11:25	-30.975	-0.95
4/16/98 13:29	3.2365	28.463	4/16/98 11:29	-30.943	1.97
4/16/98 13:33	4.995	28.54	4/16/98 11:33	-30.981	9.22
4/16/98 13:37	6.7682	20.319	4/16/98 11:37	-31.165	18.69
4/16/98 13:41	8.9291	11.1495	4/16/98 11:41	-30.549	24.75
4/16/98 13:45	10.703	7.6	4/16/98 11:45	-29.137	27.04
4/16/98 13:49	10.832	14.575	4/16/98 11:49	-27.427	30.03
4/16/98 13:53	11.159	21.595	4/16/98 11:53	-25.599	26.61
4/16/98 13:57	12.223	25.205	4/16/98 11:57	-23.729	19.08
4/16/98 14:01	13.747	27.02	4/16/98 12:01	-21.421	10.045
4/16/98 14:05	15.478	27.655	4/16/98 12:05	-20.277	11.615
4/16/98 14:09	17.264	24.36	4/16/98 12:09	-19.913	18.31
4/16/98 14:13	19.151	15.255	4/16/98 12:13	-19.412	24.985
4/16/98 14:17	21.009	7.205	4/16/98 12:17	-17.954	28.205
4/16/98 14:21	22.136	2.165	4/16/98 12:21	-16.251	30.125
4/16/98 14:25	22.202	2.66	4/16/98 12:25	-14.415	22.662
4/16/98 14:29	22.45	7.035	4/16/98 12:29	-12.313	13.4975
4/16/98 14:33	22.569	14.465	4/16/98 12:33	-10.226	3.516
4/16/98 14:37	22.734	22.56	4/16/98 12:37	-9.8826	1.919
4/16/98 14:41	23.857	26.085	4/16/98 12:41	-9.6135	0.834
4/16/98 14:45	25.462	27.35	4/16/98 12:45	-9.5228	2.0365
4/16/98 14:49	27.246	27.87	4/16/98 12:49	-9.4988	8.6025
4/16/98 14:53	29.074	28.05	4/16/98 12:53	-9.4467	16.4285
4/16/98 14:57	30.932	28.23	4/16/98 12:57	-9.1155	23.733
4/16/98 15:01	32.82	28.16	4/16/98 13:01	-7.7783	26.7395
4/16/98 15:05	34.684	28.275	4/16/98 13:05	-6.161	28.61055
4/16/98 15:09	36.578	28.225	4/16/98 13:09	-4.3689	23.3934
4/16/98 15:13	38.452	28.325	4/16/98 13:13	-2.4304	21.5735
4/16/98 15:17	40.339	28.345	4/16/98 13:17	-0.43889	20.32695
4/16/98 15:21	42.223	28.4	4/16/98 13:21	0.30978	25.6921

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4/16/98 15:25	44.117	28.27	4/16/98 13:25	1.8843	27.213
4/16/98 15:29	46.008	28.125	4/16/98 13:29	3.6265	29.507
4/16/98 15:33	47.903	28.07	4/16/98 13:33	5.4482	24.459
4/16/98 15:37	49.771	28.185	4/16/98 13:37	7.3269	16.3555
4/16/98 15:41	51.633	26.745	4/16/98 13:41	9.5279	6.6605
4/16/98 15:45	53.517	25.35	4/16/98 13:45	10.34	8.99
4/16/98 15:49	55.408	19.915	4/16/98 13:49	10.598	15.955
4/16/98 15:53	56.982	14.03	4/16/98 13:53	10.86	23.51
4/16/98 15:57	58.587	7.235	4/16/98 13:57	12.138	26.155
4/16/98 16:01	59.391	3.655	4/16/98 14:01	13.789	27.645
4/16/98 16:05	59.788	2.03	4/16/98 14:05	15.562	27.755
4/16/98 16:09	60.034	1.065	4/16/98 14:09	17.369	21.34
4/16/98 16:13	60.122	0.68	4/16/98 14:13	19.318	12.96
4/16/98 16:17	60.194	0.37	4/16/98 14:17	21.113	4.29
4/16/98 16:21	60.247	0.065	4/16/98 14:21	21.637	1.75
4/16/98 16:25	60.258	0.14	4/16/98 14:25	21.91	2.46
4/16/98 16:29	60.268	0.11	4/16/98 14:29	21.971	9.325
4/16/98 16:33	60.26	0.15	4/16/98 14:33	21.987	17.685
4/16/98 16:37	60.286	0.1	4/16/98 14:37	22.402	24.63
4/16/98 16:41	60.29	-0.035	4/16/98 14:41	23.836	26.905
4/16/98 16:45	60.29	0.14	4/16/98 14:45	25.524	27.755
4/16/98 16:49	60.306	-0.135	4/16/98 14:49	27.328	28.275
4/16/98 16:53	60.283	0.06	4/16/98 14:53	29.217	28.25
4/16/98 16:57	60.318	-0.02	4/16/98 14:57	31.075	28.425
4/16/98 17:01	60.279	0.06	4/16/98 15:01	32.983	28.25
4/16/98 17:05	60.295	0.175	4/16/98 15:05	34.867	28.365
4/16/98 17:09	60.314	-0.035	4/16/98 15:09	36.76	28.415
4/16/98 17:13	60.291	0.08	4/16/98 15:13	38.633	28.615
4/16/98 17:17	60.33	-0.22	4/16/98 15:17	40.54	28.63
4/16/98 17:21	60.307	-0.1	4/16/98 15:21	42.443	28.68
4/16/98 17:25	60.307	0.1	4/16/98 15:25	44.356	28.555
4/16/98 17:29	60.286	-0.005	4/16/98 15:29	46.266	28.505
4/16/98 17:33	60.287	0.09	4/16/98 15:33	48.179	28.45
4/16/98 17:37	60.327	-0.1	4/16/98 15:37	50.067	28.75
4/16/98 17:41	60.285	0.085	4/16/98 15:41	51.967	26.73
4/16/98 17:45	60.305	0.195	4/16/98 15:45	53.869	24.755
4/16/98 17:49	60.307	0.05	4/16/98 15:49	55.817	17.87
4/16/98 17:53	60.302	0.15	4/16/98 15:53	57.313	11.895
4/16/98 17:57	60.344	-0.06	4/16/98 15:57	58.82	5.01
4/16/98 18:01	60.317	-0.025	4/16/98 16:01	59.391	2.205
4/16/98 18:05	60.332	-0.09	4/16/98 16:05	59.692	0.87
4/16/98 18:09	60.332	-0.04	4/16/98 16:09	59.822	0.195
4/16/98 18:13	60.312	-0.06	4/16/98 16:13	59.832	0.295
4/16/98 18:17	60.314	0.025	4/16/98 16:17	59.866	0.08
4/16/98 18:21	60.324	-0.125	4/16/98 16:21	59.861	0.16
4/16/98 18:25	60.3	0.07	4/16/98 16:25	59.891	0.045
4/16/98 18:29	60.319	0.055	4/16/98 16:29	59.882	0.01
4/16/98 18:33	60.299	0.135	4/16/98 16:33	59.893	-0.045
4/16/98 18:37	60.314	0.04	4/16/98 16:37	59.9	-0.195

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4/16/98 18:41	60.33	-0.075	4/16/98 16:41	59.884	-0.035
4/16/98 18:45	60.326	0.025	4/16/98 16:45	59.884	0.04
4/16/98 18:49	60.322	0.025	4/16/98 16:49	59.861	0.06
4/16/98 18:53	60.315	0.14	4/16/98 16:53	59.877	-0.035
4/16/98 18:57	60.331	-0.17	4/16/98 16:57	59.892	-0.015
4/16/98 19:01	60.327	-0.075	4/16/98 17:01	59.873	0.16
4/16/98 19:05	60.343	-0.195	4/16/98 17:05	59.87	0.075
4/16/98 19:09	60.297	0.14	4/16/98 17:09	59.889	-0.035
4/16/98 19:13	60.312	-0.03	4/16/98 17:13	59.905	-0.115
4/16/98 19:17	60.304	0.015	4/16/98 17:17	59.885	-0.025
4/16/98 19:21	60.325	0.015	4/16/98 17:21	59.882	-0.1
4/16/98 19:25	60.306	0.07	4/16/98 17:25	59.882	0.1
4/16/98 19:29	60.307	0.065	4/16/98 17:29	59.88	0
4/16/98 19:33	60.328	-0.065	4/16/98 17:33	59.862	0.185
4/16/98 19:37	60.32	-0.125	4/16/98 17:37	59.902	-0.005
4/16/98 19:41	60.32	-0.13	4/16/98 17:41	59.88	-0.015
4/16/98 19:45	60.315	0.02	4/16/98 17:45	59.899	-0.19
4/16/98 19:49	60.295	0.04	4/16/98 17:49	59.901	0.05
4/16/98 19:53	60.294	0.16	4/16/98 17:53	59.877	0.055
4/16/98 19:57	60.319	-0.125	4/16/98 17:57	59.861	0.135
4/16/98 20:01	60.303	-0.03	4/16/98 18:01	59.911	-0.02
4/16/98 20:05	60.326	-2.56	4/16/98 18:05	59.888	0.1
4/16/98 20:09	60.294	-10.85	4/16/98 18:09	59.888	0.055
4/16/98 20:13	60.297	-20.005	4/16/98 18:13	59.907	-0.06
4/16/98 20:17	59.814	-27.435	4/16/98 18:17	59.908	-0.07
4/16/98 20:21	58.124	-28.8	4/16/98 18:21	59.899	-0.03
4/16/98 20:25	56.296	-29.395	4/16/98 18:25	59.895	0.07
4/16/98 20:29	54.327	-29.045	4/16/98 18:29	59.894	0.055
4/16/98 20:33	52.364	-28.62	4/16/98 18:33	59.893	-0.055
4/16/98 20:37	50.417	-28.43	4/16/98 18:37	59.909	0.035
4/16/98 20:41	48.518	-28.415	4/16/98 18:41	59.905	-0.075
4/16/98 20:45	46.64	-28.54	4/16/98 18:45	59.882	0.02
4/16/98 20:49	44.731	-28.585	4/16/98 18:49	59.916	-0.07
4/16/98 20:53	42.835	-28.605	4/16/98 18:53	59.89	0.04
4/16/98 20:57	40.932	-28.605	4/16/98 18:57	59.886	0.025
4/16/98 21:01	39.014	-28.6	4/16/98 19:01	59.902	-0.17
4/16/98 21:05	37.114	-28.655	4/16/98 19:05	59.898	-0.095
4/16/98 21:09	35.211	-28.605	4/16/98 19:09	59.891	0.14
4/16/98 21:13	33.294	-28.825	4/16/98 19:13	59.868	0.16
4/16/98 21:17	31.383	-28.815	4/16/98 19:17	59.879	0.015
4/16/98 21:21	29.49	-28.915	4/16/98 19:21	59.919	-0.18
4/16/98 21:25	27.529	-28.725	4/16/98 19:25	59.9	-0.025
4/16/98 21:29	25.62	-28.745	4/16/98 19:29	59.882	0.065
4/16/98 21:33	23.707	-28.755	4/16/98 19:33	59.883	0.13
4/16/98 21:37	21.784	-28.515	4/16/98 19:37	59.895	0.065
4/16/98 21:41	19.871	-28.615	4/16/98 19:41	59.895	-0.035
4/16/98 21:45	17.956	-28.535	4/16/98 19:45	59.909	0.025
4/16/98 21:49	16.081	-28.69	4/16/98 19:49	59.908	0.045
4/16/98 21:53	14.148	-28.598	4/16/98 19:53	59.888	-0.035

4/16/98 21:57	12.249	-28.589	4/16/98 19:57	59.914	-0.13
4/16/98 22:01	10.343	-28.6325	4/16/98 20:01	59.917	-0.225
4/16/98 22:05	8.4284	-28.6405	4/16/98 20:05	59.881	-3.53
4/16/98 22:09	6.5312	-28.6706	4/16/98 20:09	59.888	-12.31
4/16/98 22:13	4.6165	-28.676	4/16/98 20:13	59.872	-22.265
4/16/98 22:17	2.7003	-28.477	4/16/98 20:17	59.175	-29.025
4/16/98 22:21	0.79708	-28.7639	4/16/98 20:21	57.426	-30.015
4/16/98 22:25	-1.1187	-28.5555	4/16/98 20:25	55.419	-29.34
4/16/98 22:29	-2.9951	-28.5875	4/16/98 20:29	53.37	-28.505
4/16/98 22:33	-4.9557	-28.3765	4/16/98 20:33	51.423	-28.38
4/16/98 22:37	-6.8298	-28.641	4/16/98 20:37	49.551	-28.48
4/16/98 22:41	-8.7126	-28.792	4/16/98 20:41	47.669	-28.765
4/16/98 22:45	-10.631	-28.835	4/16/98 20:45	45.747	-28.585
4/16/98 22:49	-12.558	-28.675	4/16/98 20:49	43.855	-28.63
4/16/98 22:53	-14.471	-28.765	4/16/98 20:53	41.916	-28.555
4/16/98 22:57	-16.398	-28.69	4/16/98 20:57	40.03	-28.655
4/16/98 23:01	-18.293	-28.71	4/16/98 21:01	38.129	-28.75
4/16/98 23:05	-20.224	-28.59	4/16/98 21:05	36.205	-28.605
4/16/98 23:09	-22.136	-17.695	4/16/98 21:09	34.299	-28.655
4/16/98 23:13	-24.035	-20.975	4/16/98 21:13	32.379	-28.88
4/16/98 23:17	-25.942	-15.155	4/16/98 21:17	30.484	-28.865
4/16/98 23:21	-25.675	-18.465	4/16/98 21:21	28.568	-28.87
4/16/98 23:25	-28.23	-6.665	4/16/98 21:25	26.603	-28.575
4/16/98 23:29	-28.973	-3.315	4/16/98 21:29	24.711	-28.805
4/16/98 23:33	-29.368	-1.47	4/16/98 21:33	22.794	-28.705
4/16/98 23:37	-29.563	-0.505	4/16/98 21:37	20.888	-28.78
4/16/98 23:41	-29.636	-0.365	4/16/98 21:41	18.95	-28.565
4/16/98 23:45	-29.662	-0.24	4/16/98 21:45	17.053	-28.805
4/16/98 23:49	-29.664	-0.215	4/16/98 21:49	15.132	-28.537
4/16/98 23:53	-29.709	-0.09	4/16/98 21:53	13.237	-28.654
4/16/98 23:57	-29.71	0.065	4/16/98 21:57	11.292	-28.4345
4/17/98 0:01	-29.707	-0.05	4/16/98 22:01	9.4246	-28.7995
4/17/98 0:05	-29.727	0.09	4/16/98 22:05	7.5062	-28.918
4/17/98 0:09	-29.697	-0.02	4/16/98 22:09	5.6051	-28.8404
4/17/98 0:13	-29.717	0.115	4/16/98 22:13	3.6647	-28.958
4/17/98 0:17	-29.709	0.135	4/16/98 22:17	1.7226	-28.541
4/17/98 0:21	-29.701	0.255	4/16/98 22:21	-0.16298	-28.8281
4/17/98 0:25	-29.694	0.02	4/16/98 22:25	-2.1269	-28.512
4/17/98 0:29	-29.682	0.14	4/16/98 22:29	-3.9856	-28.878
4/17/98 0:33	-29.65	0.02	4/16/98 22:33	-5.9286	-28.102
4/17/98 0:37	-29.69	0.045	4/16/98 22:37	-7.8293	-28.0335
4/17/98 0:41	-29.654	-0.315	4/16/98 22:41	-9.7612	-27.849
4/17/98 0:45	-29.646	-0.005	4/16/98 22:45	-11.549	-28.335
4/17/98 0:49	-29.681	0.155	4/16/98 22:49	-13.436	-28.62
4/17/98 0:53	-29.717	0.345	4/16/98 22:53	-15.331	-28.59
4/17/98 0:57	-29.647	0	4/16/98 22:57	-17.216	-28.635
4/17/98 1:01	-29.65	0.07	4/16/98 23:01	-19.16	-28.425
4/17/98 1:05	-29.648	-0.12	4/16/98 23:05	-21.049	-25.515
4/17/98 1:09	-29.647	0.04	4/16/98 23:09	-22.943	-18.31

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4/17/98 1:13	-29.636	-0.085	4/16/98 23:13	-24.845	-20.55
4/17/98 1:17	-29.672	0.045	4/16/98 23:17	-26.152	-16.565
4/17/98 1:21	-29.639	-0.22	4/16/98 23:21	-26.605	-15.34
4/17/98 1:25	-29.653	-0.07	4/16/98 23:25	-28.955	-4.215
4/17/98 1:29	-29.663	-0.175	4/16/98 23:29	-29.465	-1.915
4/17/98 1:33	-29.683	0.14	4/16/98 23:33	-29.673	-0.885
4/17/98 1:37	-29.667	-0.195	4/16/98 23:37	-29.798	-0.385
4/17/98 1:41	-29.698	-0.04	4/16/98 23:41	-29.848	-0.125
4/17/98 1:45	-29.655	-0.135	4/16/98 23:45	-29.85	-0.12
4/17/98 1:49	-29.706	0.12	4/16/98 23:49	-29.875	0.135
4/17/98 1:53	-29.706	0.025	4/16/98 23:53	-29.873	0.14
4/17/98 1:57	-29.682	-0.07	4/16/98 23:57	-29.874	0.065
4/17/98 2:01	-29.682	-0.05	4/17/98 0:01	-29.848	-0.165
4/17/98 2:05	-29.701	-0.05	4/17/98 0:05	-29.845	-0.14
4/17/98 2:09	-29.696	-0.075	4/17/98 0:09	-29.861	-0.025
4/17/98 2:13	-29.692	-0.095	4/17/98 0:13	-29.881	0.115
4/17/98 2:17	-29.711	0.14	4/17/98 0:17	-29.873	0.02
4/17/98 2:21	-29.711	-0.125	4/17/98 0:21	-29.866	0.14
4/17/98 2:25	-29.711	0.02	4/17/98 0:25	-29.858	0.02
4/17/98 2:29	-29.683	-0.23	4/17/98 0:29	-29.869	0.135
4/17/98 2:33	-29.736	0.135	4/17/98 0:33	-29.838	-0.095
4/17/98 2:37	-29.707	0.09	4/17/98 0:37	-29.854	-0.075
4/17/98 2:41	-29.729	0.18	4/17/98 0:41	-29.842	-0.315
4/17/98 2:45	-29.709	-0.06	4/17/98 0:45	-29.857	-0.12
4/17/98 2:49	-29.689	-0.06	4/17/98 0:49	-29.869	0.04
4/17/98 2:53	-29.693	-0.06	4/17/98 0:53	-29.905	0.23
4/17/98 2:57	-29.721	0.035	4/17/98 0:57	-29.881	0.47
4/17/98 3:01	-29.701	-0.105	4/17/98 1:01	-29.861	0.185
4/17/98 3:05	-29.705	-0.015	4/17/98 1:05	-29.859	0.235
4/17/98 3:09	-29.714	-0.13	4/17/98 1:09	-29.787	-0.2
4/17/98 3:13	-29.722	0.24	4/17/98 1:13	-29.824	-0.085
4/17/98 3:17	-29.708	-0.085	4/17/98 1:17	-29.812	-0.31
4/17/98 3:21	-29.74	4.04	4/17/98 1:21	-29.827	-0.335
4/17/98 3:25	-29.674	12.955	4/17/98 1:25	-29.841	-0.065
4/17/98 3:29	-29.725	22.395	4/17/98 1:29	-29.874	0.06
4/17/98 3:33	-28.932	27.705	4/17/98 1:33	-29.894	0.14
4/17/98 3:37	-27.083	27.835	4/17/98 1:37	-29.854	-0.2
4/17/98 3:41	-25.246	28.115	4/17/98 1:41	-29.862	-0.04
4/17/98 3:45	-23.391	28.395	4/17/98 1:45	-29.866	0.1
4/17/98 3:49	-21.516	28.445	4/17/98 1:49	-29.894	0.125
4/17/98 3:53	-19.623	28.44	4/17/98 1:53	-29.87	0.025
4/17/98 3:57	-17.712	28.33	4/17/98 1:57	-29.846	-0.19
4/17/98 4:01	-15.827	28.615	4/17/98 2:01	-29.869	-0.055
4/17/98 4:05	-13.935	28.4035	4/17/98 2:05	-29.865	0.065
4/17/98 4:09	-12.046	28.3665	4/17/98 2:09	-29.884	0.045
4/17/98 4:13	-10.104	28.134	4/17/98 2:13	-29.88	0.025
4/17/98 4:17	-8.2543	28.3215	4/17/98 2:17	-29.852	-0.095
4/17/98 4:21	-6.3727	28.19295	4/17/98 2:21	-29.875	0.11
4/17/98 4:25	-4.4772	28.4045	4/17/98 2:25	-29.875	-0.095

4/17/98 4:29	-2.59	28.289	4/17/98 2:29	-29.871	0.005
4/17/98 4:33	-0.73411	28.50505	4/17/98 2:33	-29.853	0.135
4/17/98 4:37	1.2037	28.3175	4/17/98 2:37	-29.894	0.205
4/17/98 4:41	3.0678	28.531	4/17/98 2:41	-29.87	0.3
4/17/98 4:45	4.9669	28.4855	4/17/98 2:45	-29.826	-0.06
4/17/98 4:49	6.8672	28.449	4/17/98 2:49	-29.853	-0.18
4/17/98 4:53	8.774	28.335	4/17/98 2:53	-29.81	-0.18
4/17/98 4:57	10.664	28.355	4/17/98 2:57	-29.838	-0.085
4/17/98 5:01	12.557	28.22	4/17/98 3:01	-29.889	0.245
4/17/98 5:05	14.441	28.28	4/17/98 3:05	-29.846	-0.13
4/17/98 5:09	16.335	28.355	4/17/98 3:09	-29.855	-0.125
4/17/98 5:13	18.201	28.655	4/17/98 3:13	-29.84	0.01
4/17/98 5:17	20.097	28.56	4/17/98 3:17	-29.872	0.15
4/17/98 5:21	22.006	28.79	4/17/98 3:21	-29.88	4.505
4/17/98 5:25	23.932	28.595	4/17/98 3:25	-29.838	13.54
4/17/98 5:29	25.809	28.605	4/17/98 3:29	-29.842	22.865
4/17/98 5:33	27.764	28.31	4/17/98 3:33	-28.979	27.94
4/17/98 5:37	29.651	28.41	4/17/98 3:37	-27.13	28.185
4/17/98 5:41	31.53	28.385	4/17/98 3:41	-25.269	28.345
4/17/98 5:45	33.426	28.355	4/17/98 3:45	-23.391	28.28
4/17/98 5:49	35.333	28.305	4/17/98 3:49	-21.493	28.105
4/17/98 5:53	37.207	28.48	4/17/98 3:53	-19.6	28.1
4/17/98 5:57	39.097	28.43	4/17/98 3:57	-17.735	28.22
4/17/98 6:01	40.994	28.425	4/17/98 4:01	-15.872	28.62
4/17/98 6:05	42.903	28.325	4/17/98 4:05	-13.98	28.6285
4/17/98 6:09	44.783	28.445	4/17/98 4:09	-12.091	28.7025
4/17/98 6:13	46.679	28.32	4/17/98 4:13	-10.148	28.4645
4/17/98 6:17	48.568	28.22	4/17/98 4:17	-8.2543	28.4315
4/17/98 6:21	50.472	28.02	4/17/98 4:21	-6.3505	28.1913
4/17/98 6:25	52.343	28.055	4/17/98 4:25	-4.4551	28.403
4/17/98 6:29	54.212	26.105	4/17/98 4:29	-2.568	28.504
4/17/98 6:33	56.076	23.885	4/17/98 4:33	-0.71224	28.7197
4/17/98 6:37	57.954	16.11	4/17/98 4:37	1.2255	28.6385
4/17/98 6:41	59.433	6.2	4/17/98 4:41	3.1328	28.527
4/17/98 6:45	60.853	-1.865	4/17/98 4:45	5.0317	28.4815
4/17/98 6:49	61.176	-3.95	4/17/98 4:49	6.9532	28.334
4/17/98 6:53	60.673	-1.515	4/17/98 4:53	8.8382	28.334
4/17/98 6:57	60.48	-0.82	4/17/98 4:57	10.728	28.355
4/17/98 7:01	60.386	-0.31	4/17/98 5:01	12.62	28.43
4/17/98 7:05	60.37	-0.34	4/17/98 5:05	14.505	28.48
4/17/98 7:09	60.316	-0.13	4/17/98 5:09	16.399	28.345
4/17/98 7:13	60.324	-0.29	4/17/98 5:13	18.306	28.44
4/17/98 7:17	60.302	-0.105	4/17/98 5:17	20.201	28.45
4/17/98 7:21	60.29	0.045	4/17/98 5:21	22.068	28.79
4/17/98 7:25	60.266	0.08	4/17/98 5:25	23.994	28.9
4/17/98 7:29	60.281	-0.005	4/17/98 5:29	25.891	28.705
4/17/98 7:33	60.299	-0.04	4/17/98 5:33	27.826	28.61
4/17/98 7:37	60.282	0.005	4/17/98 5:37	29.774	28.405
4/17/98 7:41	60.28	0.145	4/17/98 5:41	31.632	28.68

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4/17/98 7:45	60.291	-0.065	4/17/98 5:45	33.548	28.65
4/17/98 7:49	60.283	0.16	4/17/98 5:49	35.455	28.595
4/17/98 7:53	60.309	0.005	4/17/98 5:53	37.368	28.375
4/17/98 7:57	60.278	0.14	4/17/98 5:57	39.278	28.32
4/17/98 8:01	60.315	0.1	4/17/98 6:01	41.174	28.415
4/17/98 8:05	60.31	0.1	4/17/98 6:05	43.043	28.515
4/17/98 8:09	60.306	0.09	4/17/98 6:09	44.942	28.635
4/17/98 8:13	60.335	-0.01	4/17/98 6:13	46.857	28.61
4/17/98 8:17	60.33	0.045	4/17/98 6:17	48.746	28.7
4/17/98 8:21	60.324	-0.035	4/17/98 6:21	50.669	28.785
4/17/98 8:25	60.333	-0.14	4/17/98 6:25	52.579	28.525
4/17/98 8:29	60.339	-0.11	4/17/98 6:29	54.486	25.99
4/17/98 8:33	60.317	0.05	4/17/98 6:33	56.426	22.81
4/17/98 8:37	60.305	-0.035	4/17/98 6:37	58.284	13.01
4/17/98 8:41	60.317	-0.065	4/17/98 6:41	59.684	2.53
4/17/98 8:45	60.327	-0.06	4/17/98 6:45	60.988	-4.86
4/17/98 8:49	60.298	0.02	4/17/98 6:49	60.886	-4.815
4/17/98 8:53	60.304	0.03	4/17/98 6:53	60.19	-1.515
4/17/98 8:57	60.315	0.1	4/17/98 6:57	60.016	-0.625
4/17/98 9:01	60.302	-0.04	4/17/98 7:01	59.923	-0.215
4/17/98 9:05	60.31	-0.06	4/17/98 7:05	59.887	-0.05
4/17/98 9:09	60.335	-0.065	4/17/98 7:09	59.891	-0.13
4/17/98 9:13	60.294	0.035	4/17/98 7:13	59.88	-0.1
4/17/98 9:17	60.298	0.04	4/17/98 7:17	59.877	-0.105
4/17/98 9:21	60.322	-0.055	4/17/98 7:21	59.865	0.045
4/17/98 9:25	60.301	0.115	4/17/98 7:25	59.86	-0.015
4/17/98 9:29	60.306	-0.075	4/17/98 7:29	59.856	-0.005
4/17/98 9:33	60.311	0.015	4/17/98 7:33	59.874	0.055
4/17/98 9:37	60.324	-0.015	4/17/98 7:37	59.857	0.1
4/17/98 9:41	60.291	0.165	4/17/98 7:41	59.855	0.05
4/17/98 9:45	60.314	0.005	4/17/98 7:45	59.885	-0.165
4/17/98 9:49	60.321	-0.05	4/17/98 7:49	59.877	-0.035
4/17/98 9:53	60.324	-0.035	4/17/98 7:53	59.865	0.1
4/17/98 9:57	60.315	0.08	4/17/98 7:57	59.852	0.05
4/17/98 10:01	60.311	0.05	4/17/98 8:01	59.87	0.005
4/17/98 10:05	60.317	0.045	4/17/98 8:05	59.885	-0.09
4/17/98 10:09	60.331	-0.015	4/17/98 8:09	59.862	0.085
4/17/98 10:13	60.321	-0.095	4/17/98 8:13	59.871	-0.105
4/17/98 10:17	60.326	0.025	4/17/98 8:17	59.867	-0.15
4/17/98 10:21	60.328	-0.025	4/17/98 8:21	59.879	-0.03
4/17/98 10:25	60.302	0.21	4/17/98 8:25	59.85	0.05
4/17/98 10:29	60.331	-0.095	4/17/98 8:29	59.837	0.08
4/17/98 10:33	60.323	-0.105	4/17/98 8:33	59.873	0.045
4/17/98 10:37	60.344	-1.3	4/17/98 8:37	59.86	0.065
4/17/98 10:41	60.312	-5.905	4/17/98 8:41	59.853	0.13
4/17/98 10:45	60.302	-12.68	4/17/98 8:45	59.882	0.04
4/17/98 10:49	60.084	-17.18	4/17/98 8:49	59.873	0.02
4/17/98 10:53	59.131	-19.845	4/17/98 8:53	59.879	0.03
4/17/98 10:57	57.766	-17.085	4/17/98 8:57	59.89	-0.095

4/17/98 11:01	56.648	-16.685	4/17/98 9:01	59.877	-0.04
4/17/98 11:05	55.162	-15.19	4/17/98 9:05	59.885	-0.155
4/17/98 11:09	54.349	-19.415	4/17/98 9:09	59.871	0.03
4/17/98 11:13	53.311	-23.155	4/17/98 9:13	59.869	-0.06
4/17/98 11:17	52.124	-26.335	4/17/98 9:17	59.854	0.23
4/17/98 11:21	50.466	-30.09	4/17/98 9:21	59.877	0.14
4/17/98 11:25	48.68	-33.745	4/17/98 9:25	59.857	0.205
4/17/98 11:29	46.857	-35.97	4/17/98 9:29	59.9	0.025
4/17/98 11:33	44.448	-34.13	4/17/98 9:33	59.905	-0.08
4/17/98 11:37	41.931	-31.585	4/17/98 9:37	59.898	-0.01
4/17/98 11:41	39.663	-29.92	4/17/98 9:41	59.905	-0.03
4/17/98 11:45	37.622	-29.43	4/17/98 9:45	59.889	0.005
4/17/98 11:49	35.614	-29.04	4/17/98 9:49	59.896	0.05
4/17/98 11:53	33.679	-28.95	4/17/98 9:53	59.899	-0.13
4/17/98 11:57	31.736	-28.98	4/17/98 9:57	59.89	-0.02
4/17/98 12:01	29.806	-28.905	4/17/98 10:01	59.906	-0.05
4/17/98 12:05	27.889	-28.855	4/17/98 10:05	59.873	0.04
4/17/98 12:09	25.94	-28.655	4/17/98 10:09	59.886	0.08
4/17/98 12:13	24.025	-28.55	4/17/98 10:13	59.896	0.1
4/17/98 12:17	22.118	-28.54	4/17/98 10:17	59.881	0.125
4/17/98 12:21	20.209	-28.56	4/17/98 10:21	59.902	-0.02
4/17/98 12:25	18.315	-28.585	4/17/98 10:25	59.916	-0.08
4/17/98 12:29	16.41	-28.595	4/17/98 10:29	59.906	0
4/17/98 12:33	14.497	-28.6235	4/17/98 10:33	59.898	0.09
4/17/98 12:37	12.598	-28.5485	4/17/98 10:37	59.9	-1.69
4/17/98 12:41	10.691	-28.561	4/17/98 10:41	59.906	-7.655
4/17/98 12:45	8.7723	-28.5765	4/17/98 10:45	59.916	-16.385
4/17/98 12:49	6.8883	-28.698	4/17/98 10:49	59.562	-24.21
4/17/98 12:53	4.9788	-28.5353	4/17/98 10:53	58.375	-26.32
4/17/98 12:57	3.057	-28.4615	4/17/98 10:57	56.639	-24.47
4/17/98 13:01	1.1487	-28.5385	4/17/98 11:01	54.72	-21.76
4/17/98 13:05	-0.72826	-28.6562	4/17/98 11:05	53.111	-15.84
4/17/98 13:09	-2.6353	-28.9445	4/17/98 11:09	51.745	-15.95
4/17/98 13:13	-4.559	-28.635	4/17/98 11:13	50.368	-19.615
4/17/98 13:17	-6.4595	-28.6825	4/17/98 11:17	49.943	-28.93
4/17/98 13:21	-8.4242	-28.339	4/17/98 11:21	48.555	-32.4
4/17/98 13:25	-10.286	-28.465	4/17/98 11:25	46.445	-31.78
4/17/98 13:29	-12.196	-28.62	4/17/98 11:29	44.157	-30.115
4/17/98 13:33	-14.092	-28.795	4/17/98 11:33	42.075	-29.23
4/17/98 13:37	-15.979	-28.92	4/17/98 11:37	40.089	-29.065
4/17/98 13:41	-17.92	-28.71	4/17/98 11:41	38.134	-28.785
4/17/98 13:45	-19.851	-28.615	4/17/98 11:45	36.229	-28.795
4/17/98 13:49	-21.763	-19.515	4/17/98 11:49	34.276	-28.805
4/17/98 13:53	-23.662	-21.51	4/17/98 11:53	32.377	-29.025
4/17/98 13:57	-25.574	-16.41	4/17/98 11:57	30.47	-28.95
4/17/98 14:01	-25.666	-18.335	4/17/98 12:01	28.515	-28.675
4/17/98 14:05	-27.964	-7.61	4/17/98 12:05	26.572	-28.415
4/17/98 14:09	-28.856	-3.675	4/17/98 12:09	24.68	-28.735
4/17/98 14:13	-29.333	-1.585	4/17/98 12:13	22.78	-28.835

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4/17/98 14:17	-29.486	-0.88	4/17/98 12:17	20.889	-28.825
4/17/98 14:21	-29.591	-0.435	4/17/98 12:21	18.933	-28.53
4/17/98 14:25	-29.65	-0.195	4/17/98 12:25	17.013	-28.665
4/17/98 14:29	-29.662	-0.085	4/17/98 12:29	15.124	-28.675
4/17/98 14:33	-29.678	-0.13	4/17/98 12:33	13.227	-28.705
4/17/98 14:37	-29.689	-0.075	4/17/98 12:37	11.28	-28.525
4/17/98 14:41	-29.679	-0.14	4/17/98 12:41	9.389	-28.646
4/17/98 14:45	-29.704	-0.15	4/17/98 12:45	7.486	-28.442
4/17/98 14:49	-29.704	0.185	4/17/98 12:49	5.575	-28.3469
4/17/98 14:53	-29.707	0.07	4/17/98 12:53	3.6598	-28.6215
4/17/98 14:57	-29.734	0.17	4/17/98 12:57	1.7976	-28.8755
4/17/98 15:01	-29.667	-0.18	4/17/98 13:01	-0.094387	-28.8426
4/17/98 15:05	-29.693	-0.16	4/17/98 13:05	-2.0645	-28.5235
4/17/98 15:09	-29.7	-0.02	4/17/98 13:09	-3.9775	-28.701
4/17/98 15:13	-29.703	0.12	4/17/98 13:13	-5.8629	-28.1605
4/17/98 15:17	-29.725	-0.02	4/17/98 13:17	-7.7692	-28.099
4/17/98 15:21	-29.704	-0.7	4/17/98 13:21	-9.7177	-27.5265
4/17/98 15:25	-29.679	-0.33	4/17/98 13:25	-11.495	-28.21
4/17/98 15:29	-29.729	0.115	4/17/98 13:29	-13.389	-28.355
4/17/98 15:33	-29.844	1.06	4/17/98 13:33	-15.223	-28.87
4/17/98 15:37	-29.745	0.61	4/17/98 13:37	-17.137	-28.89
4/17/98 15:41	-29.706	0.385	4/17/98 13:41	-19.06	-28.91
4/17/98 15:45	-29.632	0.005	4/17/98 13:45	-20.997	-25.325
4/17/98 15:49	-29.623	0.07	4/17/98 13:49	-22.915	-19.45
4/17/98 15:53	-29.629	0.09	4/17/98 13:53	-24.842	-20.635
4/17/98 15:57	-29.631	0.115	4/17/98 13:57	-26.062	-16.665
4/17/98 16:01	-29.609	0.135	4/17/98 14:01	-26.805	-14.16
4/17/98 16:05	-29.611	0.16	4/17/98 14:05	-28.969	-3.755
4/17/98 16:09	-29.608	0.04	4/17/98 14:09	-29.395	-1.805
4/17/98 16:13	-29.582	0.06	4/17/98 14:13	-29.637	-0.885
4/17/98 16:17	-29.579	0.04	4/17/98 14:17	-29.72	-0.295
4/17/98 16:21	-29.6	0.04	4/17/98 14:21	-29.756	-0.08
4/17/98 16:25	-29.57	-0.33	4/17/98 14:25	-29.814	-0.08
4/17/98 16:29	-29.571	-0.315	4/17/98 14:29	-29.779	0.03
4/17/98 16:33	-29.592	-0.08	4/17/98 14:33	-29.772	-0.245
4/17/98 16:37	-29.636	0.295	4/17/98 14:37	-29.83	0.16
4/17/98 16:41	-29.634	0.135	4/17/98 14:41	-29.773	-0.14
4/17/98 16:45	-29.608	-0.045	4/17/98 14:45	-29.821	0.085
4/17/98 16:49	-29.577	-0.155	4/17/98 14:49	-29.798	0.19
4/17/98 16:53	-29.607	0.035	4/17/98 14:53	-29.801	0.07
4/17/98 16:57	-29.617	0.085	4/17/98 14:57	-29.804	0.05
4/17/98 17:01	-29.608	-0.075	4/17/98 15:01	-29.76	-0.185
4/17/98 17:05	-29.6	-0.085	4/17/98 15:05	-29.787	0.075
4/17/98 17:09	-29.6	-0.095	4/17/98 15:09	-29.794	-0.02
4/17/98 17:13	-29.623	0.135	4/17/98 15:13	-29.797	0.12
4/17/98 17:17	-29.617	0.07	4/17/98 15:17	-29.772	-0.84
4/17/98 17:21	-29.619	-0.035	4/17/98 15:21	-29.798	-0.35
4/17/98 17:25	-29.596	-0.26	4/17/98 15:25	-29.773	-0.09
4/17/98 17:29	-29.603	-0.13	4/17/98 15:29	-29.94	0.815

4/17/98 17:33	-29.626	0.18	4/17/98 15:33	-29.868	0.595
4/17/98 17:37	-29.648	0.01	4/17/98 15:37	-29.791	0.255
4/17/98 17:41	-29.629	0.085	4/17/98 15:41	-29.777	0.27
4/17/98 17:45	-29.59	-0.035	4/17/98 15:45	-29.749	0.12
4/17/98 17:49	-29.646	0.11	4/17/98 15:49	-29.74	0.07
4/17/98 17:53	-29.612	0.01	4/17/98 15:53	-29.723	0.09
4/17/98 17:57	-29.597	0.035	4/17/98 15:57	-29.725	0.235
4/17/98 18:01	-29.624	0.125	4/17/98 16:01	-29.726	0.135
4/17/98 18:05	-29.61	0.13	4/17/98 16:05	-29.705	-0.19
4/17/98 18:09	-29.59	4.65	4/17/98 16:09	-29.678	-0.315
4/17/98 18:13	-29.599	13.825	4/17/98 16:13	-29.699	0.06
4/17/98 18:17	-29.584	22.865	4/17/98 16:17	-29.743	-0.08
4/17/98 18:21	-28.66	27.67	4/17/98 16:21	-29.741	0.16
4/17/98 18:25	-26.834	27.885	4/17/98 16:25	-29.687	-0.215
4/17/98 18:29	-25.011	28.22	4/17/98 16:29	-29.759	0.39
4/17/98 18:33	-23.126	28.165	4/17/98 16:33	-29.709	0.04
4/17/98 18:37	-21.257	28.395	4/17/98 16:37	-29.73	-0.29
4/17/98 18:41	-19.367	28.39	4/17/98 16:41	-29.681	-0.095
4/17/98 18:45	-17.493	28.445	4/17/98 16:45	-29.701	0.07
4/17/98 18:49	-15.578	28.2295	4/17/98 16:49	-29.788	0.43
4/17/98 18:53	-13.689	28.258	4/17/98 16:53	-29.7	0.035
4/17/98 18:57	-11.804	28.265	4/17/98 16:57	-29.687	-0.03
4/17/98 19:01	-9.9321	28.407	4/17/98 17:01	-29.702	-0.075
4/17/98 19:05	-8.0374	28.194	4/17/98 17:05	-29.693	-0.205
4/17/98 19:09	-6.151	28.31165	4/17/98 17:09	-29.693	-0.215
4/17/98 19:13	-4.2507	28.209	4/17/98 17:13	-29.717	0.015
4/17/98 19:17	-2.3986	28.4365	4/17/98 17:17	-29.734	-0.165
4/17/98 19:21	-0.48867	28.20635	4/17/98 17:21	-29.736	-0.15
4/17/98 19:25	1.3911	28.3495	4/17/98 17:25	-29.714	-0.26
4/17/98 19:29	3.2887	28.33	4/17/98 17:29	-29.767	0.105
4/17/98 19:33	5.1526	28.442	4/17/98 17:33	-29.766	-0.06
4/17/98 19:37	7.061	28.425	4/17/98 17:37	-29.766	0.135
4/17/98 19:41	8.9547	28.4115	4/17/98 17:41	-29.746	0.085
4/17/98 19:45	10.841	28.505	4/17/98 17:45	-29.778	0.205
4/17/98 19:49	12.746	28.445	4/17/98 17:49	-29.739	0.105
4/17/98 19:53	14.637	28.525	4/17/98 17:53	-29.729	-0.105
4/17/98 19:57	16.542	28.085	4/17/98 17:57	-29.737	0.03
4/17/98 20:01	18.435	23.725	4/17/98 18:01	-29.718	0.01
4/17/98 20:05	20.342	17.015	4/17/98 18:05	-29.75	1.065
4/17/98 20:09	22.159	2.545	4/17/98 18:09	-29.731	9.445
4/17/98 20:13	23.18	-5.58	4/17/98 18:13	-29.716	18.365
4/17/98 20:17	23.745	-8.6	4/17/98 18:17	-29.537	26.915
4/17/98 20:21	22.668	-3.7	4/17/98 18:21	-27.842	27.73
4/17/98 20:25	22.064	-1.265	4/17/98 18:25	-26.043	28.29
4/17/98 20:29	22.025	-1.45	4/17/98 18:29	-24.154	28.27
4/17/98 20:33	21.928	-1.325	4/17/98 18:33	-22.296	28.445
4/17/98 20:37	21.811	-1.035	4/17/98 18:37	-20.385	28.335
4/17/98 20:41	21.735	-0.825	4/17/98 18:41	-18.5	28.445
4/17/98 20:45	21.663	-0.76	4/17/98 18:45	-16.607	28.385

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4/17/98 20:49	21.604	-0.57	4/17/98 18:49	-14.718	28.394
4/17/98 20:53	21.57	-0.505	4/17/98 18:53	-12.811	28.313
4/17/98 20:57	21.511	-0.31	4/17/98 18:57	-10.93	28.431
4/17/98 21:01	21.49	-0.19	4/17/98 19:01	-9.0392	28.238
4/17/98 21:05	21.469	-0.085	4/17/98 19:05	-7.1484	28.2455
4/17/98 21:09	21.449	-0.09	4/17/98 19:09	-5.2438	28.14325
4/17/98 21:13	21.452	0	4/17/98 19:13	-3.3916	28.371
4/17/98 21:17	21.452	0	4/17/98 19:17	-1.4993	28.4865
4/17/98 21:21	21.431	0.105	4/17/98 19:21	0.38485	28.47375
4/17/98 21:25	21.452	0.105	4/17/98 19:25	2.2826	28.615
4/17/98 21:29	21.452	0.21	4/17/98 19:29	4.198	28.4865
4/17/98 21:33	21.452	0.19	4/17/98 19:33	6.0796	28.382
4/17/98 21:37	21.473	0.295	4/17/98 19:37	8.0056	28.367
4/17/98 21:41	21.494	0.275	4/17/98 19:41	9.8953	28.4585
4/17/98 21:45	21.49	0.4	4/17/98 19:45	11.756	28.555
4/17/98 21:49	21.532	0.31	4/17/98 19:49	13.679	28.495
4/17/98 21:53	21.549	0.31	4/17/98 19:53	15.587	28.575
4/17/98 21:57	21.57	0.31	4/17/98 19:57	17.467	25.435
4/17/98 22:01	21.594	0.32	4/17/98 20:01	19.378	17.14
4/17/98 22:05	21.611	0.315	4/17/98 20:05	21.302	4.22
4/17/98 22:09	21.632	0.29	4/17/98 20:09	22.554	-2.235
4/17/98 22:13	21.658	0.215	4/17/98 20:13	22.806	-3.605
4/17/98 22:17	21.674	0.22	4/17/98 20:17	22.146	0.02
4/17/98 22:21	21.69	0.335	4/17/98 20:21	22.107	-0.475
4/17/98 22:25	21.701	0.365	4/17/98 20:25	22.085	-0.955
4/17/98 22:29	21.718	0.265	4/17/98 20:29	22.15	-1.765
4/17/98 22:33	21.757	0.275	4/17/98 20:33	22.012	-1.54
4/17/98 22:37	21.774	0.2	4/17/98 20:37	21.894	-1.24
4/17/98 22:41	21.771	0.425	4/17/98 20:41	21.797	-0.925
4/17/98 22:45	21.812	0.19	4/17/98 20:45	21.704	-0.545
4/17/98 22:49	21.814	0.235	4/17/98 20:49	21.646	-0.36
4/17/98 22:53	21.856	0.105	4/17/98 20:53	21.612	-0.295
4/17/98 22:57	21.85	0.195	4/17/98 20:57	21.595	-0.11
4/17/98 23:01	21.861	0.22	4/17/98 21:01	21.574	-0.09
4/17/98 23:05	21.877	0.225	4/17/98 21:05	21.553	0.12
4/17/98 23:09	21.889	0.245	4/17/98 21:09	21.573	0.125
4/17/98 23:13	21.905	0.25	4/17/98 21:13	21.556	0.21
4/17/98 23:17	21.922	0.23	4/17/98 21:17	21.577	0.105
4/17/98 23:21	21.938	0.155	4/17/98 21:21	21.598	0.105
4/17/98 23:25	21.955	0.13	4/17/98 21:25	21.598	0.21
4/17/98 23:29	21.968	0.04	4/17/98 21:29	21.598	0.315
4/17/98 23:33	21.969	0.075	4/17/98 21:33	21.619	0.29
4/17/98 23:37	21.981	0.08	4/17/98 21:37	21.64	0.185
4/17/98 23:41	21.976	0.165	4/17/98 21:41	21.661	0.165
4/17/98 23:45	21.984	0.17	4/17/98 21:45	21.677	0.295
4/17/98 23:49	21.997	0.065	4/17/98 21:49	21.677	0.315
4/17/98 23:53	22.009	-0.035	4/17/98 21:53	21.694	0.315
4/17/98 23:57	22.018	-0.015	4/17/98 21:57	21.736	0.105
4/18/98 0:01	22.01	0.09	4/17/98 22:01	21.74	0.32

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4/18/98 0:05	22.002	0.09	4/17/98 22:05	21.757	0.31
4/18/98 0:09	22.015	0.195	4/17/98 22:09	21.757	0.29
4/18/98 0:13	22.028	-0.01	4/17/98 22:13	21.804	0.21
4/18/98 0:17	22.02	0.115	4/17/98 22:17	21.819	0.12
4/18/98 0:21	22.054	-0.01	4/17/98 22:21	21.815	0.125
4/18/98 0:25	22.026	0.09	4/17/98 22:25	21.846	0.16
4/18/98 0:29	22.043	-0.035	4/17/98 22:29	21.843	0.26
4/18/98 0:33	22.052	0.09	4/17/98 22:33	21.84	0.28
4/18/98 0:37	22.044	-0.01	4/17/98 22:37	21.878	0.2
4/18/98 0:41	22.036	-0.01	4/17/98 22:41	21.895	0.115
4/18/98 0:45	22.07	-0.22	4/17/98 22:45	21.896	0.29
4/18/98 0:49	22.042	-0.015	4/17/98 22:49	21.918	0.13
4/18/98 0:53	22.034	0.09	4/17/98 22:53	21.918	0.21
4/18/98 0:57	22.026	-0.01	4/17/98 22:57	21.954	0.09
4/18/98 1:01	22.039	-0.03	4/17/98 23:01	21.944	0.225
4/18/98 1:05	22.052	-0.135	4/17/98 23:05	21.96	0.12
4/18/98 1:09	22.024	0.07	4/17/98 23:09	21.972	0.04
4/18/98 1:13	22.033	0.01	4/17/98 23:13	21.989	0.04
4/18/98 1:17	22.025	0.01	4/17/98 23:17	21.984	0.025
4/18/98 1:21	22.038	-0.095	4/17/98 23:21	21.98	0.05
4/18/98 1:25	22.035	0.005	4/17/98 23:25	21.997	0.02
4/18/98 1:29	22.027	0.005	4/17/98 23:29	21.989	0.14
4/18/98 1:33	22.019	-0.075	4/17/98 23:33	21.99	-0.03
4/18/98 1:37	22.036	-0.075	4/17/98 23:37	22.001	0.08
4/18/98 1:41	22.028	-0.075	4/17/98 23:41	22.017	-0.04
4/18/98 1:45	22.004	0.05	4/17/98 23:45	21.984	0.065
4/18/98 1:49	22.021	-0.08	4/17/98 23:49	22.017	-0.14
4/18/98 1:53	22.013	0	4/17/98 23:53	22.009	-0.035
4/18/98 1:57	22.014	-0.025	4/17/98 23:57	21.997	0.09
4/18/98 2:01	22.005	-0.15	4/18/98 0:01	21.989	-0.01
4/18/98 2:05	22.013	-0.075	4/18/98 0:05	22.002	-0.01
4/18/98 2:09	22.009	-0.07	4/18/98 0:09	22.015	-0.115
4/18/98 2:13	21.975	0.05	4/18/98 0:13	21.987	-0.015
4/18/98 2:17	21.998	-0.11	4/18/98 0:17	22	0.005
4/18/98 2:21	21.995	-0.015	4/18/98 0:21	21.992	-0.015
4/18/98 2:25	21.985	-0.11	4/18/98 0:25	21.984	-0.01
4/18/98 2:29	21.976	0.04	4/18/98 0:29	22.001	-0.135
4/18/98 2:33	21.992	-0.19	4/18/98 0:33	21.989	-0.115
4/18/98 2:37	21.963	0.015	4/18/98 0:37	21.982	-0.015
4/18/98 2:41	21.984	-0.03	4/18/98 0:41	21.974	-0.01
4/18/98 2:45	21.954	-0.025	4/18/98 0:45	21.966	-0.01
4/18/98 2:49	21.966	-0.13	4/18/98 0:49	21.979	-0.01
4/18/98 2:53	21.978	-0.21	4/18/98 0:53	21.972	-0.12
4/18/98 2:57	21.949	0	4/18/98 0:57	21.964	-0.015
4/18/98 3:01	21.94	-0.1	4/18/98 1:01	21.977	-0.135
4/18/98 3:05	21.936	-0.015	4/18/98 1:05	21.948	0.075
4/18/98 3:09	21.949	-0.12	4/18/98 1:09	21.961	-0.03
4/18/98 3:13	21.92	0.005	4/18/98 1:13	21.95	0.005
4/18/98 3:17	21.933	-0.125	4/18/98 1:17	21.963	-0.095

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4/18/98 3:21	21.925	-0.095	4/18/98 1:21	21.955	-0.095
4/18/98 3:25	21.921	-0.11	4/18/98 1:25	21.951	-0.095
4/18/98 3:29	21.908	-0.08	4/18/98 1:29	21.944	-0.1
4/18/98 3:33	21.906	-0.19	4/18/98 1:33	21.936	-0.08
4/18/98 3:37	21.899	0.015	4/18/98 1:37	21.932	-0.075
4/18/98 3:41	21.892	-0.055	4/18/98 1:41	21.924	-0.075
4/18/98 3:45	21.868	0.18	4/18/98 1:45	21.92	0.055
4/18/98 3:49	21.902	-0.12	4/18/98 1:49	21.917	-0.08
4/18/98 3:53	21.881	-0.06	4/18/98 1:53	21.909	0
4/18/98 3:57	21.904	-0.215	4/18/98 1:57	21.931	-0.13
4/18/98 4:01	21.878	-0.04	4/18/98 2:01	21.901	0.055
4/18/98 4:05	21.869	-0.015	4/18/98 2:05	21.909	-0.075
4/18/98 4:09	21.861	-0.015	4/18/98 2:09	21.905	-0.075
4/18/98 4:13	21.87	-0.08	4/18/98 2:13	21.912	-0.05
4/18/98 4:17	21.866	-0.1	4/18/98 2:17	21.894	-0.005
4/18/98 4:21	21.858	-0.185	4/18/98 2:21	21.89	-0.01
4/18/98 4:25	21.854	-0.08	4/18/98 2:25	21.902	-0.215
4/18/98 4:29	21.846	-0.08	4/18/98 2:29	21.893	-0.17
4/18/98 4:33	21.821	0.025	4/18/98 2:33	21.888	-0.085
4/18/98 4:37	21.838	0.005	4/18/98 2:37	21.859	0.015
4/18/98 4:41	21.83	-0.095	4/18/98 2:41	21.859	-0.03
4/18/98 4:45	21.826	-0.095	4/18/98 2:45	21.871	-0.03
4/18/98 4:49	21.839	-0.095	4/18/98 2:49	21.862	-0.025
4/18/98 4:53	21.811	-0.08	4/18/98 2:53	21.853	0
4/18/98 4:57	21.807	-0.08	4/18/98 2:57	21.865	-0.1
4/18/98 5:01	21.82	-0.165	4/18/98 3:01	21.857	-0.1
4/18/98 5:05	21.795	-0.055	4/18/98 3:05	21.853	-0.12
4/18/98 5:09	21.791	-0.035	4/18/98 3:09	21.845	-0.225
4/18/98 5:13	21.787	-0.035	4/18/98 3:13	21.837	-0.1
4/18/98 5:17	21.784	-0.04	4/18/98 3:17	21.829	-0.125
4/18/98 5:21	21.784	-0.125	4/18/98 3:21	21.8	0.01
4/18/98 5:25	21.78	-0.105	4/18/98 3:25	21.817	-0.005
4/18/98 5:29	21.776	-0.085	4/18/98 3:29	21.804	-0.08
4/18/98 5:33	21.759	0	4/18/98 3:33	21.802	0.015
4/18/98 5:37	21.759	0	4/18/98 3:37	21.816	-0.09
4/18/98 5:41	21.759	0	4/18/98 3:41	21.788	0.05
4/18/98 5:45	21.759	0	4/18/98 3:45	21.805	-0.13
4/18/98 5:49	21.759	-0.005	4/18/98 3:49	21.798	-0.015
4/18/98 5:53	21.759	0.025	4/18/98 3:53	21.798	-0.165
4/18/98 5:57	21.759	-0.06	4/18/98 3:57	21.779	-0.11
4/18/98 6:01	21.758	-0.02	4/18/98 4:01	21.795	-0.25
4/18/98 6:05	21.764	-0.03	4/18/98 4:05	21.765	-0.015
4/18/98 6:09	21.747	-0.025	4/18/98 4:09	21.757	0.085
4/18/98 6:13	21.754	0.04	4/18/98 4:13	21.745	-0.08
4/18/98 6:17	21.758	0.03	4/18/98 4:17	21.762	0.005
4/18/98 6:21	21.742	0.175	4/18/98 4:21	21.774	-0.18
4/18/98 6:25	21.762	-0.02	4/18/98 4:25	21.729	0.025
4/18/98 6:29	21.764	-0.125	4/18/98 4:29	21.763	-0.08
4/18/98 6:33	21.777	-0.07	4/18/98 4:33	21.738	-0.08

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4/18/98 6:37	21.758	0.02	4/18/98 4:37	21.734	-0.1
4/18/98 6:41	21.739	0.115	4/18/98 4:41	21.747	-0.1
4/18/98 6:45	21.763	0.01	4/18/98 4:45	21.722	0.005
4/18/98 6:49	21.762	0.145	4/18/98 4:49	21.714	-0.095
4/18/98 6:53	21.762	-0.035	4/18/98 4:53	21.727	-0.075
4/18/98 6:57	21.765	0.07	4/18/98 4:57	21.723	-0.075
4/18/98 7:01	21.791	-0.15	4/18/98 5:01	21.695	-0.06
4/18/98 7:05	21.755	0.045	4/18/98 5:05	21.712	-0.165
4/18/98 7:09	21.779	0.045	4/18/98 5:09	21.708	-0.04
4/18/98 7:13	21.761	0.155	4/18/98 5:13	21.683	-0.035
4/18/98 7:17	21.764	0.07	4/18/98 5:17	21.679	-0.035
4/18/98 7:21	21.788	-0.01	4/18/98 5:21	21.7	-0.12
4/18/98 7:25	21.792	-0.015	4/18/98 5:25	21.676	0
4/18/98 7:29	21.778	0.225	4/18/98 5:29	21.672	0.02
4/18/98 7:33	21.786	6.125	4/18/98 5:33	21.676	0
4/18/98 7:37	21.789	13.48	4/18/98 5:37	21.676	0
4/18/98 7:41	21.823	12.67	4/18/98 5:41	21.676	0
4/18/98 7:45	23.011	-4.5	4/18/98 5:45	21.676	0
4/18/98 7:49	24.485	-14.35	4/18/98 5:49	21.676	-0.01
4/18/98 7:53	24.357	-14.51	4/18/98 5:53	21.676	0.13
4/18/98 7:57	22.111	-4.18	4/18/98 5:57	21.676	0.04
4/18/98 8:01	21.615	-2.18	4/18/98 6:01	21.674	-0.015
4/18/98 8:05	21.455	-1.6	4/18/98 6:05	21.702	-0.035
4/18/98 8:09	21.275	-0.785	4/18/98 6:09	21.684	0.085
4/18/98 8:13	21.179	-0.215	4/18/98 6:13	21.671	0.035
4/18/98 8:17	21.135	0.11	4/18/98 6:17	21.695	-0.07
4/18/98 8:21	21.118	0.155	4/18/98 6:21	21.701	-0.04
4/18/98 8:25	21.136	0.045	4/18/98 6:25	21.678	0.085
4/18/98 8:29	21.157	-0.085	4/18/98 6:29	21.681	0.185
4/18/98 8:33	21.149	-0.09	4/18/98 6:33	21.693	0.035
4/18/98 8:37	21.145	0.01	4/18/98 6:37	21.695	0.125
4/18/98 8:41	21.14	-0.07	4/18/98 6:41	21.718	-0.095
4/18/98 8:45	21.131	-0.02	4/18/98 6:45	21.7	0.01
4/18/98 8:49	21.147	0.205	4/18/98 6:49	21.72	-0.065
4/18/98 8:53	21.126	0.525	4/18/98 6:53	21.699	0.07
4/18/98 8:57	21.127	0.49	4/18/98 6:57	21.702	0.07
4/18/98 9:01	21.188	0.245	4/18/98 7:01	21.707	0.165
4/18/98 9:05	21.231	0.085	4/18/98 7:05	21.713	0.15
4/18/98 9:09	21.225	0.18	4/18/98 7:09	21.716	-0.055
4/18/98 9:13	21.237	0.045	4/18/98 7:13	21.74	0.05
4/18/98 9:17	21.248	0.005	4/18/98 7:17	21.743	-0.03
4/18/98 9:21	21.261	0.105	4/18/98 7:21	21.705	0.195
4/18/98 9:25	21.246	0.21	4/18/98 7:25	21.75	-0.01
4/18/98 9:29	21.249	0.115	4/18/98 7:29	21.737	0.225
4/18/98 9:33	21.282	0.14	4/18/98 7:33	21.744	6.85
4/18/98 9:37	21.288	-0.15	4/18/98 7:37	21.748	9.75
4/18/98 9:41	21.272	-0.02	4/18/98 7:41	21.782	-1.875
4/18/98 9:45	21.31	-8.15	4/18/98 7:45	23.114	-11.89
4/18/98 9:49	21.258	-15.735	4/18/98 7:49	23.698	-14.795

4/18/98 9:53	21.268	-24.64	4/18/98 7:53	21.407	-4.135
4/18/98 9:57	19.68	-25.91	4/18/98 7:57	20.736	-0.955
4/18/98 10:01	18.111	-27.515	4/18/98 8:01	20.739	-1.14
4/18/98 10:05	16.34	-28.18	4/18/98 8:05	20.58	-0.455
4/18/98 10:09	14.498	-28.4215	4/18/98 8:09	20.545	-0.26
4/18/98 10:13	12.608	-28.6775	4/18/98 8:13	20.511	0.1
4/18/98 10:17	10.704	-24.0505	4/18/98 8:17	20.489	0.105
4/18/98 10:21	8.8137	-22.3315	4/18/98 8:21	20.493	0.15
4/18/98 10:25	6.8725	-19.4895	4/18/98 8:25	20.531	-0.06
4/18/98 10:29	5.8939	-17.7315	4/18/98 8:29	20.51	0.125
4/18/98 10:33	4.3474	-11.1795	4/18/98 8:33	20.523	0.015
4/18/98 10:37	2.9746	-4.823	4/18/98 8:37	20.519	0.115
4/18/98 10:41	2.3476	-1.8685	4/18/98 8:41	20.535	0.035
4/18/98 10:45	2.1115	-1.955	4/18/98 8:45	20.526	0.085
4/18/98 10:49	2.01	-2.327	4/18/98 8:49	20.542	-0.005
4/18/98 10:53	1.9739	-2.427	4/18/98 8:53	20.542	0.005
4/18/98 10:57	1.7205	-1.462	4/18/98 8:57	20.543	-0.03
4/18/98 11:01	1.5446	-0.539	4/18/98 9:01	20.541	-0.07
4/18/98 11:05	1.4885	-0.2565	4/18/98 9:05	20.543	0.815
4/18/98 11:09	1.4281	-0.0815	4/18/98 9:09	20.537	2.16
4/18/98 11:13	1.4368	-0.124	4/18/98 9:13	20.527	2.345
4/18/98 11:17	1.4372	-0.2135	4/18/98 9:17	20.706	1.57
4/18/98 11:21	1.4118	-0.1345	4/18/98 9:21	20.969	0.42
4/18/98 11:25	1.412	-0.094	4/18/98 9:25	20.996	0.21
4/18/98 11:29	1.3945	-0.1635	4/18/98 9:29	21.02	0.01
4/18/98 11:33	1.3849	0.014	4/18/98 9:33	21.053	0.035
4/18/98 11:37	1.3932	-0.2045	4/18/98 9:37	21.038	0.055
4/18/98 11:41	1.3618	0.3265	4/18/98 9:41	21.022	0.085
4/18/98 11:45	1.3877	5.3395	4/18/98 9:45	21.06	-1.995
4/18/98 11:49	1.3523	13.03	4/18/98 9:49	21.049	-9.24
4/18/98 11:53	1.4271	21.136	4/18/98 9:53	21.039	-17.61
4/18/98 11:57	2.4556	24.959	4/18/98 9:57	20.661	-24.795
4/18/98 12:01	3.9583	26.697	4/18/98 10:01	19.201	-26.92
4/18/98 12:05	5.6543	27.5585	4/18/98 10:05	17.517	-28.21
4/18/98 12:09	7.4474	23.138	4/18/98 10:09	15.702	-28.883
4/18/98 12:13	9.2977	14.5815	4/18/98 10:13	13.817	-29.1395
4/18/98 12:17	11.166	6.04	4/18/98 10:17	11.875	-28.9365
4/18/98 12:21	12.075	2.155	4/18/98 10:21	9.9254	-25.837
4/18/98 12:25	12.214	2.32	4/18/98 10:25	7.9891	-21.93
4/18/98 12:29	12.374	2.355	4/18/98 10:29	6.0877	-21.091
4/18/98 12:33	12.506	2.815	4/18/98 10:33	4.758	-16.386
4/18/98 12:37	12.678	2.965	4/18/98 10:37	3.6031	-11.446
4/18/98 12:41	12.845	3.44	4/18/98 10:41	1.8695	-3.1765
4/18/98 12:45	13.069	3.205	4/18/98 10:45	1.4808	-1.522
4/18/98 12:49	13.271	3.485	4/18/98 10:49	1.3139	-1.0235
4/18/98 12:53	13.533	3.27	4/18/98 10:53	1.2342	-0.6875
4/18/98 12:57	13.71	3.59	4/18/98 10:57	1.1764	-0.483
4/18/98 13:01	13.968	3.375	4/18/98 11:01	1.1092	-0.213
4/18/98 13:05	14.187	3.695	4/18/98 11:05	1.0967	0.0695

4/18/98 13:09	14.428	3.37	4/18/98 11:09	1.0798	0.3535
4/18/98 13:13	14.643	3.495	4/18/98 11:13	1.0666	0.6385
4/18/98 13:17	14.926	3.28	4/18/98 11:17	1.1106	0.222
4/18/98 13:21	15.102	3.705	4/18/98 11:21	1.1505	0.0835
4/18/98 13:25	15.342	3.6	4/18/98 11:25	1.1943	-0.094
4/18/98 13:29	15.582	3.595	4/18/98 11:29	1.155	0.163
4/18/98 13:33	15.843	3.28	4/18/98 11:33	1.1672	0.2315
4/18/98 13:37	16.062	3.295	4/18/98 11:37	1.1755	0.122
4/18/98 13:41	16.301	8.565	4/18/98 11:41	1.1876	1.0885
4/18/98 13:45	16.499	19.545	4/18/98 11:45	1.2135	7.8385
4/18/98 13:49	16.721	28.39	4/18/98 11:49	1.1999	16.063
4/18/98 13:53	18.014	33.475	4/18/98 11:53	1.4053	23.938
4/18/98 13:57	20.408	32.715	4/18/98 11:57	2.7812	26.1205
4/18/98 14:01	22.399	33.065	4/18/98 12:01	4.4125	27.5245
4/18/98 14:05	24.709	31.375	4/18/98 12:05	6.1929	28.0555
4/18/98 14:09	26.951	29.7	4/18/98 12:09	8.0053	23.4285
4/18/98 14:13	29.012	28.87	4/18/98 12:13	9.9174	14.988
4/18/98 14:17	30.984	28.555	4/18/98 12:17	11.804	6.78
4/18/98 14:21	32.891	28.45	4/18/98 12:21	12.691	3.53
4/18/98 14:25	34.786	28.45	4/18/98 12:25	12.915	3.8
4/18/98 14:29	36.695	27.625	4/18/98 12:29	13.16	3.935
4/18/98 14:33	38.581	26.515	4/18/98 12:33	13.397	4.075
4/18/98 14:37	40.476	21.755	4/18/98 12:37	13.675	4.225
4/18/98 14:41	42.22	15.64	4/18/98 12:41	13.947	4.17
4/18/98 14:45	43.884	8.595	4/18/98 12:45	14.212	4.365
4/18/98 14:49	44.827	4.625	4/18/98 12:49	14.52	4.005
4/18/98 14:53	45.348	2.47	4/18/98 12:53	14.781	4.11
4/18/98 14:57	45.603	1.47	4/18/98 12:57	15.085	3.89
4/18/98 15:01	45.752	0.775	4/18/98 13:01	15.321	3.995
4/18/98 15:05	45.842	-2.39	4/18/98 13:05	15.603	3.785
4/18/98 15:09	45.897	-11.865	4/18/98 13:09	15.863	3.68
4/18/98 15:13	45.907	-23.345	4/18/98 13:13	16.12	3.695
4/18/98 15:17	45.364	-29.8	4/18/98 13:17	16.36	3.585
4/18/98 15:21	43.524	-29.905	4/18/98 13:21	16.599	3.585
4/18/98 15:25	41.238	-28.015	4/18/98 13:25	16.859	3.27
4/18/98 15:29	39.404	-28.43	4/18/98 13:29	17.077	3.27
4/18/98 15:33	37.543	-28.63	4/18/98 13:33	17.316	3.06
4/18/98 15:37	35.635	-28.65	4/18/98 13:37	17.513	3.075
4/18/98 15:41	33.718	-23	4/18/98 13:41	17.731	6.55
4/18/98 15:45	31.817	-21.67	4/18/98 13:45	17.928	17.09
4/18/98 15:49	29.905	-16.085	4/18/98 13:49	18.128	24.68
4/18/98 15:53	29.118	-17.52	4/18/98 13:53	19.041	29.99
4/18/98 15:57	27.483	-9.745	4/18/98 13:57	21.346	28.95
4/18/98 16:01	26.688	-6.02	4/18/98 14:01	23.064	30.15
4/18/98 16:05	25.614	-0.915	4/18/98 14:05	25.039	29.825
4/18/98 16:09	25.534	-0.905	4/18/98 14:09	27.136	28.875
4/18/98 16:13	25.484	-0.83	4/18/98 14:13	29.094	28.565
4/18/98 16:17	25.431	-0.865	4/18/98 14:17	31.004	28.355
4/18/98 16:21	25.353	-0.59	4/18/98 14:21	32.911	28.35

DAT35

4/18/98 16:25	25.318	-0.605	4/18/98 14:25	34.807	28.345
4/18/98 16:29	25.258	-0.44	4/18/98 14:29	36.675	27.425
4/18/98 16:33	25.235	-0.325	4/18/98 14:33	38.581	25.52
4/18/98 16:37	25.197	-0.2	4/18/98 14:37	40.476	19.47
4/18/98 16:38	25.17	-0.1	4/18/98 14:41	42.16	12.86
			4/18/98 14:45	43.685	5.915
			4/18/98 14:49	44.37	2.74
			4/18/98 14:53	44.732	1.08
			4/18/98 14:57	44.868	0.58
			4/18/98 15:01	44.918	0.175
			4/18/98 15:05	44.948	-0.005
			4/18/98 15:09	44.984	0.065
			4/18/98 15:13	44.953	0.075
			4/18/98 15:17	44.947	0.255
			4/18/98 15:21	44.997	0.06
			4/18/98 15:25	44.968	0.16
			4/18/98 15:29	44.998	-0.045
			4/18/98 15:33	45.009	0.065
			4/18/98 15:37	45	0.05
			4/18/98 15:41	44.989	-1.13
			4/18/98 15:45	45.022	-10.815
			4/18/98 15:49	45.01	-20.515
			4/18/98 15:53	44.763	-28.715
			4/18/98 15:57	42.859	-28.65
			4/18/98 16:01	40.907	-28.54
			4/18/98 16:05	39.02	-28.6
			4/18/98 16:09	37.129	-26.04
			4/18/98 16:13	35.199	-19.42
			4/18/98 16:17	33.3	-14.615
			4/18/98 16:21	31.921	-19.315
			4/18/98 16:25	31.315	-28.935
			4/18/98 16:29	30.377	-25.205
			4/18/98 16:33	28.058	-13.61
			4/18/98 16:37	25.528	-6
			4/18/98 16:38	25.336	-1

Section 3B: Frequency and Power Hysteresis - F04

This section contains data regarding frequency and power hysteresis. In three temperature cycles, the maximum change in frequency was 3 kHz and the maximum change in power of 0.35 dB, both neglectfully small.

AE-26758A
21 Jan 98

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: R. Hail
Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290329	57.290333	57.290337	57.290336	57.290338	57.290339
Output Power 17 to 20 dBm	* 21.06 dBm	19.72 dBm 19.6 dBm	19.75 dBm	19.75 dBm	19.92 dBm	20.05 dBm
Frequency 57.290344 GHz ±200 kHz	57.290336	57.290336	57.290339			
Output Power 17 to 20 dBm	19.55 dBm	19.34 dBm	19.69 dBm			

* Measurement is not part of family of measurements.

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Shop Order No.: 491618

Unit Serial No.: F04

Date: 4/13/98

Test Engineer: R. Hail

Quality Assurance: 4/17/98

DCMC: E. Salasgac

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 1

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	23.7°C	+15.01/528mA	-15.04/57.71mA
32 ±3	31.2°C	15.01/532mA	-15.06/58.37mA
42 ±3	40.6°C	15.01/538mA	-15.04/59.30mA
52 ±3	51.9°C	15.01/544mA	-15.04/60.11mA
60 ±2 Note 2	59.2°C	15.01/549mA	-15.04/60.7mA
52 ±3	49.9°C	15.01/540mA	-15.02/60.8mA
42 ±3	53.0°C 39.0°C	15.02/530mA	-15.03/59.2mA
32 ±3	40.4°C 29.0°C	15.02/530mA	-15.03/58.7mA
22 ±2 Notes 1, 3	21.9°C	15.02/529mA	-15.03/57.7mA
12 ±3 (Unit Off)	11.7°C	15.00 N/A 522mA	-15.02 N/A 56.55mA
2 ±3 (Unit Off)	2.1°C	15.01 N/A 516mA	-15.00 N/A 55.47mA
-12 ±3 (Unit Off)	-11.3°C	15.01 N/A 506mA	-14.99 N/A 53.66mA
-22 ±3 (Unit Off)	-22.9°C	15.01 N/A 494mA	-14.97 N/A 53.28mA
-30 ±2 (Unit Off) Note 2	-29.5°C	15.01 N/A 489mA	-14.97 N/A 52.37mA
-30 ±2 Note 4	-30.0°C	15.01 489mA	-14.99 -52.28mA
-20 ±3	-19.2°C	15.02 502mA	-15.07 -52.9mA
-10 ±3	-9.7°C	15.02 508mA	-15.06 -54.17mA
0 ±3	0.1°C	15.02 515.3mA	-15.02 -55.33mA
10 ±3	9.5°C	15.02 521.4mA	-15.06 -56.43mA
22 ±2 Note 1	20.8°C	15.02 528mA	-15.05 -57.58mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431618

Unit Serial No.: F04

Date: 4/13/98

Test Engineer: R. Haif

Quality Assurance: 4/20/98

DCMC: 4/20/98

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 2

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	22.4 °C	15.02 529 mA	-15.05 -57.74 mA
32 ±3	32.8 °C	15.02 534 mA	-15.05 -58.64 mA
42 ±3	42.2 °C	15.02 539 mA	-15.05 -59.44 mA
52 ±3	51.7 °C	15.01 544.6 mA	-15.06 -60.23 mA
60 ±2 Note 2	59.0 °C	15.00 548.7 mA	-15.04 -60.76 mA
52 ±3	52.7 °C	15.02 541 mA	-15.02 60.4 mA
42 ±3	41.4 °C	15.02 535 mA	-15.03 60.04 mA
32 ±3	31.8 °C	15.02 530 mA	-15.03 58.93 mA
22 ±2 Notes 1, 3	23.4 °C	15.02 529 mA	-15.03 57.90 mA
12 ±3 (Unit Off)	12.4 °C	N/A	N/A
2 ±3 (Unit Off)	2.9 °C	N/A	N/A
-12 ±3 (Unit Off)	-12.3 °C	N/A	N/A
-22 ±3 (Unit Off)	-22.0 °C	N/A	N/A
-30 ±2 (Unit Off) Note 2	-30.0 °C	N/A	N/A
-30 ±2 Note 4	-31.0 °C	15.01 / 487 mA	-15.01 / 52.31 mA
-20 ±3	-20.6 °C	15.02 / 498 mA	-15.03 / 53.33 mA
-10 ±3	-11.0 °C	15.02 / 506 mA	-15.06 / 54.92 mA
0 ±3	-1.6 °C	15.02 / 513 mA	-15.06 / 55.3 mA
10 ±3	9.9 °C	15.02 / 521 mA	-15.05 / 56.55 mA
22 ±2 Note 1	20.8 °C	15.01 / 528 mA	-15.06 / 57.65 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431618

Unit Serial No.: F04

Date: 04/14/98

Test Engineer: R. Hail

Quality Assurance: 12/15 4/12/98

DCMC: J. Salazar

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 3

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	21.3°C	15.02/528 mA	-15.07/-57.68 mA
32 ±3	30.9°C	15.01/533 mA	-15.06/-58.59 mA
42 ±3	40.4°C	15.01/538 mA	-15.04/-59.49 mA
52 ±3	51.8°C	15.01/545 mA	-15.05/-60.30 mA
60 ±2 Note 2	60.7°C	15.00/550 mA	-15.05/-60.98 mA
52 ±3	53.0°C	15.01/546 mA	-15.02/-60.39 mA
42 ±3	42.9°C	15.02/540 mA	-15.02/-59.60 mA
32 ±3	32.7°C	15.02/535 mA	-15.02/-58.76 mA
22 ±2 Notes 1, 3	22.6°C	15.02/529 mA	-15.02/-57.97 mA
12 ±3 (Unit Off)	11.5°C	N/A	N/A
2 ±3 (Unit Off)	1.3°C	N/A	N/A
-12 ±3 (Unit Off)	-11.9°C	N/A	N/A
-22 ±3 (Unit Off)	-21.3°C	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.8°C	N/A	N/A
-30 ±2 Note 4	-29.9°C	15.02/489 mA	-15.03/-52.5 mA
-20 ±3	-21.1°C	15.02/498 mA	-15.06/-53.2 mA
-10 ±3	-11.6°C	15.02/507 mA	-15.06/-54.1 mA
0 ±3	-0.2°C	15.02/514 mA	-15.06/-55.4 mA
10 ±3	9.4°C	15.02/521 mA	-15.04/-56.6 mA
22 ±2 Note 1	22.4°C	15.02/528 mA	-15.05/-57.8 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

Shop Order No.: 431618

Unit Serial No.: F04

Date: 04/15/98

Test Engineer: M. Spolma

Quality Assurance: (261/2) A/17/98

DCMC: [Signature]

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 4

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	23.2 °C	15.02 / 528 mA	-15.05 / 57.9 mA
32 ±3	32.9 °C	15.02 / 534 mA	-15.03 / 58.8 mA
42 ±3	42.4 °C	15.02 / 539 mA	-15.02 / 59.6 mA
52 ±3	51.9 °C	15.01 / 546 mA	-15.02 / 60.4 mA
60 ±2 Note 2	59.4 °C	15.00 / 549 mA	-15.01 / 60.9 mA
52 ±3	N/A	N/A	N/A
42 ±3			
32 ±3			
22 ±2 Notes 1, 3			
12 ±3 (Unit Off)		N/A	N/A
2 ±3 (Unit Off)		N/A	N/A
-12 ±3 (Unit Off)		N/A	N/A
-22 ±3 (Unit Off)		N/A	N/A
-30 ±2 (Unit Off) Note 2	N/A	N/A	N/A
-30 ±2 Note 4	-30.9 °C	15.02 / 487 mA	-15.03 / -52.27 mA
-20 ±3	-19.9 °C	15.02 / 499 mA	-15.10 / -53.36 mA
-10 ±3	-9.90 °C	15.02 / 508 mA	-15.08 / -54.33 mA
0 ±3	-0.40 °C	15.02 / 514 mA	-15.08 / -55.46 mA
10 ±3	9.50 °C	15.02 / 520 mA	-15.09 / -56.51 mA
22 ±2 Note 1	21.6 °C	15.02 / 527 mA	-15.09 / 57.79 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

EPR/00157
#06

Shop Order No.: 431618

Test Engineer: [Signature]

Unit Serial No.: F04

Quality Assurance: 7A 190 4/20/98

Date: 4/15/98

DCMC: [Signature] 4/20/98

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 5 SHT 1 of 2

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1	23.2 °C	15.02 / 528mA	-15.05 / 57.9 mA
32 ±3	33.0 °C	15.02 / 533mA	-15.08 / 58.81 mA
42 ±3	42.4 °C	15.02 / 539mA	-15.07 / 59.7mA
52 ±3	52.0	15.01 / 544mA	-15.07 / 60.38mA
60 ±2 Note 2	59.7 °C	15.01 / 540mA	-15.04 / 61.32mA
52 ±3	N/A	N/A	N/A
42 ±3			
32 ±3			
22 ±2 Notes 1, 3			
12 ±3 (Unit Off)		N/A	N/A
2 ±3 (Unit Off)		N/A	N/A
-12 ±3 (Unit Off)		N/A	N/A
-22 ±3 (Unit Off)	N/A	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.0 °C	N/A	N/A
-30 ±2 Note 4	-28.1 °C	15.02 / 491mA	-15.07 / 52.9mA
-20 ±3	-21.5 °C	15.02 / 497mA	-15.09 / 53.17mA
-10 ±3	-12.1 °C	15.02 / 506mA	-15.09 / 54.7mA
0 ±3	4.5 °C	15.02 / 513mA	-15.09 / 55.40mA
10 ±3	10.7 °C	15.01 / 520mA	-15.08 / 56.65mA
22 ±2 Note 1	20.2 °C	15.01 / 526mA	-15.09 / 57.68mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

EQP 100156
#06

Shop Order No.: 431618

Test Engineer: M.R. Harbrough

Unit Serial No.: F04

Quality Assurance: 4/20/98 (TA 190)

Date: 4/16/98

DCMC: (TA 190) 4/20/98

21 Jan 98

TEST DATA SHEET 7 (Sheet 2 of 3)
Temperature Cycling (Paragraph 4.2.2)

CYCLE # 6

SHT 2002
m.r. jacobson
4/19/98

Baseplate Temperature °C	Actual Baseplate Temperature TC1	+15V Current	-15V Current
22 ±2 Note 1 CONT From SHT 1 OF 2			
32 ±3	31.6 °C	15.01 / 532 ma	-15.08 / -58.71 ma
42 ±3	41.2 °C	15.01 / 538 ma	-15.09 / -59.60 ma
52 ±3	50.7 °C	15.01 / 544 ma	-15.09 / -60.36 ma
60 ±2 Note 2	61.0 °C	15.01 / 540 ma	-15.04 / -61.45 ma
52 ±3	N/A	N/A	N/A
42 ±3	N/A	N/A	N/A
32 ±3	N/A	N/A	N/A
22 ±2 Notes 1, 3	N/A	N/A	N/A
12 ±3 (Unit Off)	N/A	N/A	N/A
2 ±3 (Unit Off)	N/A	N/A	N/A
-12 ±3 (Unit Off)	N/A	N/A	N/A
-22 ±3 (Unit Off)	N/A	N/A	N/A
-30 ±2 (Unit Off) Note 2	-29.6 °C	N/A	N/A
-30 ±2 Note 4	-29.7 °C	15.01 / 488 mA	-14.97 / -52.4 mA
-20 ±3	-20.4 °C	15.01 / 498 mA	-15.04 / -53.3 mA
-10 ±3	-10.9 °C	15.02 / 506 mA	-15.08 / -54.6 mA
0 ±3	0.4 °C	15.02 / 515 mA	-15.08 / -55.6 mA
10 ±3	9.9 °C	15.02 / 520 mA	-15.08 / -56.5 mA
22 ±2 Note 1	22.6 °C	15.02 / 528 mA	-15.08 / -57.9 mA

NOTES:

1. Stabilize for minimum of 5 minutes. Record frequency output power and current as required for corresponding cycle number (reference Figure 12). After recording data, cycle dc power and verify unit reacquires lock.
2. Minimum 4 hour dwell at temperature.
3. Turn OFF unit power for transition to cold.
4. After soak, turn ON unit power, record temperature and currents.

EQCR 100156
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Shop Order No.: 431618Unit Serial No.: F04Date: 4/17/98Test Engineer: M. SpolmanQuality Assurance: 4/20/98 DCMC:  4/20/98

TEST DATA SHEET 7 (Sheet 3 of 3)
Temperature Cycling (Paragraph 4.2.2)

Step No.	Time	Date	TC#1
1.	6:30 PM	4/12/98	23.9°C
2.	7:00 PM	"	"
3.	8:20 PM	"	59.2°C
4.	12:20 AM	4/14/98	60.9°C
5.	2:40 AM	4/14/98	21.9°C
6.	3:25 AM	4/14/98	21.0°C
7.	5:20 AM	4/14/98	-30.10°C
8.	9:25 AM	04/14/98	-30.0°C
9.	11:20 AM	04/14/98	20.8°C
10.	13:25 11:50	04/14/98	59.0°C 22.4°C T.T. L 4/14/98
11.	17:25 1:30	4/14/98	60.2°C 59.0°C T.T. L 4/14/98
12.	17:55 5:30	4/14/98	60.2°C
13.	7:10 7:40 PM	4/14/98	23.3°C
14.	7:40 PM	4/14/98	23.3°C
15.	9:40 PM	4/14/98	-30.0°C
16.	1:45 AM	4/15/98	-31.0°C
17.	4:10 AM	4/15/98	21.3°C
18.	4:15 AM	4/15/98	21.3°C
19.	5:45 AM	4/15/98	61.5°C
20.	9:45 AM	4/15/98	60.1°C
21.	12:50 PM	4/15/98	22.3°C
22.	1:20 PM	4/15/98	22.3°C
23.	4:00 PM	4/15/98	-29.8°C
24.	8:00 PM	4/15/98	-29.9°C
25.	9:55 PM	4/15/98	+22.4°C
26.	10:25 PM	4/15/98	23.2°C
27.	00:00	4/16/98	59.9°C M. Spohn
28.	04:00	4/16/98	60.0°C
29.	07:20	4/16/98	-30.3°C
30.	11:20 AM	4/16/98	-30.9°C
31.	4:05 PM	4/16/98	59.8°C
32.	8:10 PM	4/16/98	59.9°C
33.	11:25 PM	4/16/98	-29.5°C
34.	3:25 AM	4/17/98	-29.8°C
35.	06:35 AM	4/17/98	58.3°C
36.	10:38 AM	4/17/98	59.9°C
37.	2:05 PM	4/17/98	-29.6°C
38.	6:10 PM	4/17/98	-29.7°C
39.	8:08 PM	4/17/98	22.6°C
40.	8:20 PM	4/17/98	22.1°C

Shop Order No.: 431618

Test Engineer: R. Hargis

Unit Serial No.: F04

Quality Assurance: 4/17/98

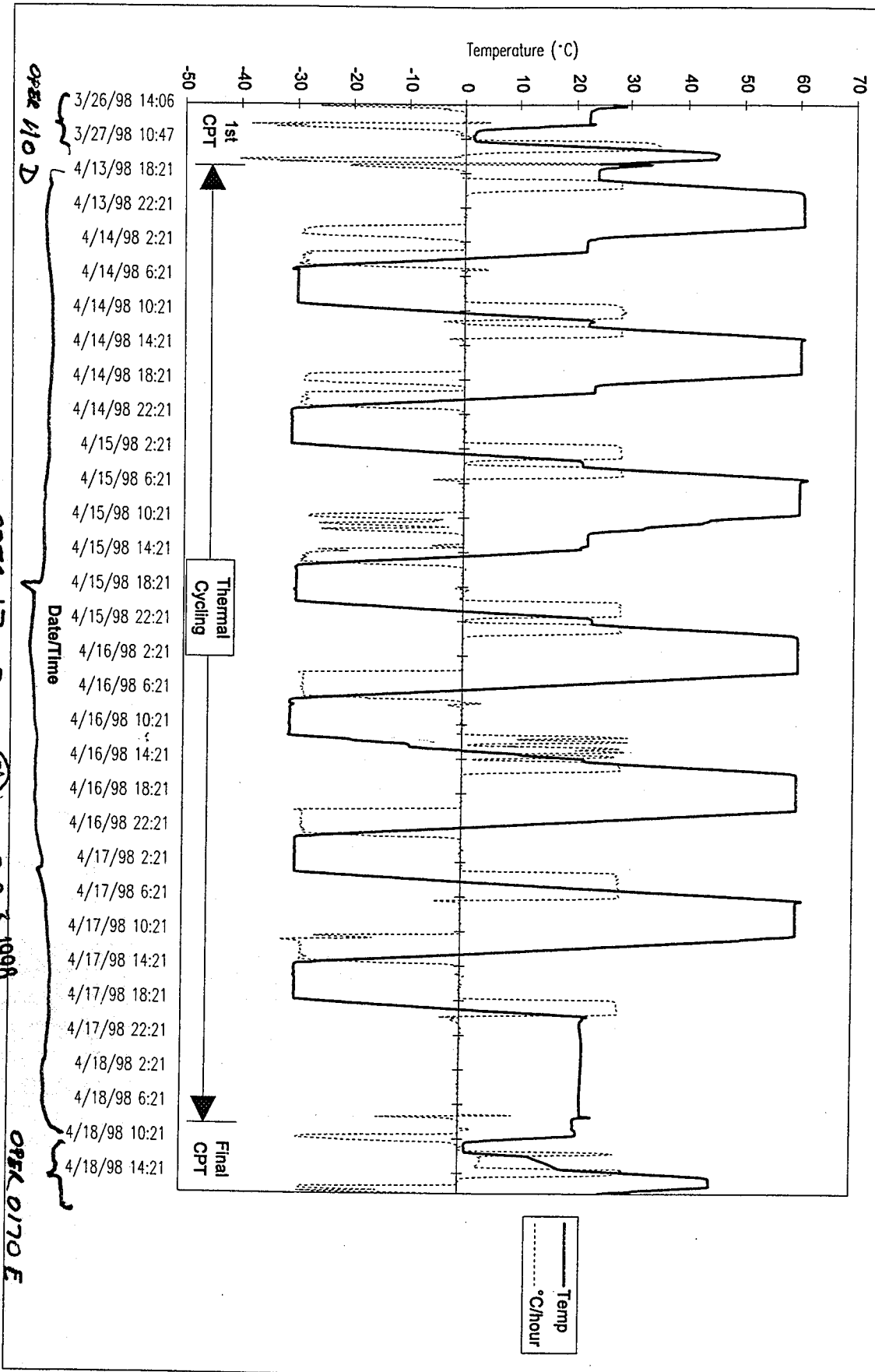
Date: 4/13/98

DCMC: C. Salas

5/0 431618

4/22/98

PLO F04 Temperature Data for First CPT, Thermal Cycling, and Final CPT



7A 190

APR 23 1998

F03

DAT35

F04

Baseplate

Date/Time	Temp	°C/hour
3/27/98 14:45	22.115	0.425
3/27/98 14:49	22.087	-4.76
3/27/98 14:53	22.08	-12.48
3/28/98 9:48	22.2	-23.29
3/28/98 9:52	21.135	-29.01
3/28/98 9:56	19.584	-32.575
3/28/98 10:00	17.542	-33.68
3/28/98 10:04	15.333	-34.336
3/28/98 10:08	13.069	-34.7885
3/28/98 10:12	10.806	-27.0155
3/28/98 10:16	8.4658	-27.7495
3/28/98 10:20	6.1113	-19.7105
3/28/98 10:24	5.4029	-18.058
3/28/98 10:28	2.9159	-6.677
3/28/98 10:32	2.1692	-3.5305
3/28/98 10:36	1.7913	-1.9195
3/28/98 10:40	1.5805	-1.085
3/28/98 10:44	1.4631	0.273
3/28/98 10:48	1.4074	0.4905
3/28/98 10:52	1.3635	0.7565
3/28/98 10:56	1.5177	-0.0075
3/28/98 11:00	1.5055	-0.0245
3/28/98 11:04	1.5148	-0.195
3/28/98 11:08	1.5162	0.0975
3/28/98 11:12	1.5006	0.132
3/28/98 11:16	1.4758	5.391
3/28/98 11:20	1.5357	14.479
3/28/98 11:24	1.527	24.905
3/28/98 11:28	2.554	30.7915
3/28/98 11:32	4.4315	32.8275
3/28/98 11:36	6.508	33.77
3/28/98 11:40	8.7123	34.3285
3/28/98 11:44	10.997	34.515
3/28/98 11:48	13.262	34.695
3/28/98 11:52	15.578	33.77
3/28/98 11:56	17.9	31.855
3/28/98 12:00	20.201	29.205
3/28/98 12:04	22.332	26.74
3/28/98 12:08	24.271	24.515
3/28/98 12:12	26.042	22.465
3/28/98 12:16	27.68	20.265
3/28/98 12:20	29.174	18.49
3/28/98 12:24	30.535	16.98
3/28/98 12:28	31.733	15.615
3/28/98 12:32	32.872	14.375
3/28/98 12:36	33.931	16.58
3/28/98 12:40	34.856	28.97
3/28/98 12:44	35.747	35.325

Baseplate

Date/Time	Temp	°C/hour
3/26/98 14:06	26.644	12.135
3/26/98 14:10	27.729	2.08
3/26/98 14:14	28.747	-16.795
3/26/98 14:18	29.071	-26.07
3/26/98 14:22	28.145	-23.715
3/26/98 14:26	25.388	-10.31
3/26/98 14:30	23.857	-3.975
3/26/98 14:34	23.402	-2.905
3/26/98 14:35	23.326	-4.1
3/26/98 14:39	23.062	-3.2
3/26/98 14:43	22.821	-2.14
3/26/98 14:47	22.506	-0.735
3/26/98 14:51	22.422	-0.555
3/26/98 14:55	22.393	-0.39
3/26/98 14:59	22.359	-0.345
3/26/98 15:03	22.311	-0.08
3/26/98 15:07	22.315	-0.08
3/26/98 15:11	22.29	0.025
3/26/98 15:15	22.295	-0.11
3/26/98 15:19	22.299	-0.12
3/26/98 15:23	22.295	-0.245
3/26/98 15:27	22.273	-0.09
3/26/98 15:31	22.275	-0.08
3/26/98 15:35	22.246	0.085
3/26/98 15:39	22.255	0.075
3/26/98 15:43	22.259	-0.1
3/26/98 15:47	22.263	0.09
3/26/98 15:51	22.27	-0.055
3/26/98 15:55	22.239	0.07
3/26/98 15:59	22.281	-0.33
3/26/98 16:03	22.259	-0.435
3/26/98 16:07	22.253	4.55
3/26/98 16:11	22.215	3.32
3/27/98 8:59	22.172	-15.19
3/27/98 9:03	23.163	-31.54
3/27/98 9:07	22.879	-38.3
3/27/98 9:11	19.134	-29.33
3/27/98 9:15	16.855	-28.705
3/27/98 9:19	15.219	-31.804
3/27/98 9:23	13.268	-33.8435
3/27/98 9:27	11.114	-29.748
3/27/98 9:31	8.8582	-27.362
3/27/98 9:35	6.4993	-19.56
3/27/98 9:39	5.1644	-14.504
3/27/98 9:43	3.3858	-6.6
3/27/98 9:47	2.5873	-3.1965
3/27/98 9:51	2.2636	-1.8455
3/27/98 9:55	2.0658	-1.2755

DAT35

3/28/98 12:48	37.247	32.175	3/27/98 9:59	1.948	-1.002
3/28/98 12:52	40.65	17.105	3/27/98 10:03	1.8945	-0.857
3/28/98 12:56	42.812	7.45	3/27/98 10:07	1.8107	-0.55
3/28/98 13:00	43.682	3.67	3/27/98 10:11	1.7476	-1.2175
3/28/98 13:04	44.071	1.94	3/27/98 10:15	1.7231	-1.796
3/28/98 13:08	44.302	1.025	3/27/98 10:19	1.7007	-1.6635
3/28/98 13:12	44.416	0.635	3/27/98 10:23	1.5041	-0.472
3/28/98 13:16	44.459	0.62	3/27/98 10:27	1.3639	0.7065
3/28/98 13:20	44.507	0.4	3/27/98 10:31	1.368	0.9605
3/28/98 13:24	44.543	0.22	3/27/98 10:35	1.4097	1.096
3/28/98 13:28	44.583	-0.26	3/27/98 10:39	1.5052	0.4685
3/28/98 13:32	44.587	-0.385	3/27/98 10:43	1.5601	0.401
3/28/98 13:36	44.587	-0.315	3/27/98 10:47	1.6289	0.039
3/28/98 13:40	44.531	-0.055	3/27/98 10:51	1.5989	0.696
3/28/98 13:44	44.51	0.07	3/27/98 10:55	1.6403	6.0215
3/28/98 13:48	44.524	-0.675	3/27/98 10:59	1.6367	14.683
3/28/98 13:52	44.52	-8.735	3/27/98 11:03	1.7381	24.479
3/28/98 13:56	44.524	-18.99	3/27/98 11:07	2.8446	29.7405
3/28/98 14:00	44.389	-28.93	3/27/98 11:11	4.5733	32.3685
3/28/98 14:04	42.773	-32.095	3/27/98 11:15	6.6339	33.3405
3/28/98 14:08	40.726	-33.405	3/27/98 11:19	8.7927	33.9565
3/28/98 14:12	38.603	-34.385	3/27/98 11:23	11.047	34.185
3/28/98 14:16	36.354	-34.01	3/27/98 11:27	13.302	34.435
3/28/98 14:20	34.045	-28.43	3/27/98 11:31	15.584	34.65
3/28/98 14:24	31.726	-2.25	3/27/98 11:35	17.884	34.885
3/28/98 14:28	29.552	4.36	3/27/98 11:39	20.189	35.015
3/28/98 14:32	28.359	5.45	3/27/98 11:43	22.514	35.225
4/13/98 17:21	31.276	-16.195	3/27/98 11:47	24.861	35.045
4/13/98 17:25	30.424	-15.57	3/27/98 11:51	27.192	35.22
4/13/98 17:29	29.449	-19.005	3/27/98 11:55	29.559	34.985
4/13/98 17:33	28.037	-16.73	3/27/98 11:59	31.87	34.935
4/13/98 17:37	27.31	-15.095	3/27/98 12:03	34.236	34.18
4/13/98 17:41	25.648	-7.885	3/27/98 12:07	36.556	32.42
4/13/98 17:45	24.691	-3.67	3/27/98 12:11	38.857	26.27
4/13/98 17:49	24.291	-1.8	3/27/98 12:15	41.072	18.01
4/13/98 17:53	24.071	-0.815	3/27/98 12:19	43.04	9.72
4/13/98 17:57	23.957	-0.465	3/27/98 12:23	44.111	5.23
4/13/98 18:01	23.931	-0.47	3/27/98 12:27	44.674	2.985
4/13/98 18:05	23.908	-0.41	3/27/98 12:31	44.984	1.775
4/13/98 18:09	23.864	-0.12	3/27/98 12:35	45.157	0.525
4/13/98 18:13	23.837	0.045	3/27/98 12:39	45.271	-0.32
4/13/98 18:17	23.826	0.15	3/27/98 12:43	45.339	-1.225
4/13/98 18:21	23.84	0.23	3/27/98 12:47	45.262	-1.395
4/13/98 18:25	23.846	0.14	3/27/98 12:51	45.207	-1.325
4/13/98 18:29	23.856	0.035	3/27/98 12:55	45.094	-0.96
4/13/98 18:33	23.886	-0.07	3/27/98 12:59	44.983	-6.59
4/13/98 18:37	23.874	0.055	3/27/98 13:03	44.942	-17.95
4/13/98 18:41	23.863	0.205	3/27/98 13:07	44.902	-31.42
4/13/98 18:45	23.872	-0.015	3/27/98 13:11	43.665	-39.24

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4/13/98 18:49	23.885	-0.035	3/27/98 13:15	41.352	-40.36
4/13/98 18:53	23.904	0.04	3/27/98 13:19	38.618	-38.52
4/13/98 18:57	23.869	4.67	3/27/98 13:23	35.817	-31.7
4/13/98 19:01	23.878	12.015	3/27/98 13:27	33.28	-28.56
4/13/98 19:05	23.912	20.38	3/27/98 13:31	30.914	-33.315
4/13/98 19:09	24.803	24.79	3/27/98 13:35	29.477	20.3
4/13/98 19:13	26.281	26.57	3/27/98 13:39	27.568	22.14
4/13/98 19:17	27.988	27.47	3/27/98 13:43	24.251	33.97
4/13/98 19:21	29.761	27.925	4/13/98 17:21	33.537	-19.705
4/13/98 19:25	31.595	28.22	4/13/98 17:25	31.996	-20.45
4/13/98 19:29	33.482	28.2	4/13/98 17:29	31.045	-19.05
4/13/98 19:33	35.346	28.275	4/13/98 17:33	29.596	-20.705
4/13/98 19:37	37.239	28.27	4/13/98 17:37	27.906	-15.49
4/13/98 19:41	39.122	28.3	4/13/98 17:41	27.235	-14.265
4/13/98 19:45	41.001	28.315	4/13/98 17:45	25.455	-6.355
4/13/98 19:49	42.893	28.31	4/13/98 17:49	24.808	-3.765
4/13/98 19:53	44.782	28.285	4/13/98 17:53	24.382	-2.16
4/13/98 19:57	46.664	28.285	4/13/98 17:57	24.184	-1.285
4/13/98 20:01	48.555	28.205	4/13/98 18:01	24.055	-0.88
4/13/98 20:05	50.439	28.01	4/13/98 18:05	23.95	-0.205
4/13/98 20:09	52.321	25.875	4/13/98 18:09	23.927	-0.125
4/13/98 20:13	54.196	23.66	4/13/98 18:13	23.879	0.04
4/13/98 20:17	56.041	17.915	4/13/98 18:17	23.909	-0.06
4/13/98 20:21	57.496	12.365	4/13/98 18:21	23.902	-0.08
4/13/98 20:25	58.928	6.345	4/13/98 18:25	23.887	0.04
4/13/98 20:29	59.624	3.33	4/13/98 18:29	23.897	0.035
4/13/98 20:33	59.969	1.8	4/13/98 18:33	23.886	0.035
4/13/98 20:37	60.197	0.875	4/13/98 18:37	23.895	0.055
4/13/98 20:41	60.29	0.5	4/13/98 18:41	23.904	0.1
4/13/98 20:45	60.329	0.495	4/13/98 18:45	23.893	0.19
4/13/98 20:49	60.372	0.14	4/13/98 18:49	23.906	-0.14
4/13/98 20:53	60.39	0.115	4/13/98 18:53	23.924	-0.575
4/13/98 20:57	60.428	0.005	4/13/98 18:57	23.931	3.635
4/13/98 21:01	60.4	0.03	4/13/98 19:01	23.878	10.57
4/13/98 21:05	60.413	0.045	4/13/98 19:05	23.809	18.94
4/13/98 21:09	60.429	-0.03	4/13/98 19:09	24.658	23.565
4/13/98 21:13	60.406	0.065	4/13/98 19:13	25.992	26.075
4/13/98 21:17	60.422	0.085	4/13/98 19:17	27.597	27.19
4/13/98 21:21	60.423	0.08	4/13/98 19:21	29.371	27.645
4/13/98 21:25	60.419	0.1	4/13/98 19:25	31.207	27.84
4/13/98 21:29	60.439	-0.1	4/13/98 19:29	33.035	28.12
4/13/98 21:33	60.439	0	4/13/98 19:33	34.9	28.3
4/13/98 21:37	60.439	0.015	4/13/98 19:37	36.775	28.395
4/13/98 21:41	60.419	0.115	4/13/98 19:41	38.659	28.325
4/13/98 21:45	60.439	0.015	4/13/98 19:45	40.56	28.24
4/13/98 21:49	60.442	0.125	4/13/98 19:49	42.454	28.33
4/13/98 21:53	60.442	-0.075	4/13/98 19:53	44.324	28.41
4/13/98 21:57	60.442	0.015	4/13/98 19:57	46.208	28.505
4/13/98 22:01	60.467	-0.015	4/13/98 20:01	48.12	28.525

DAT35

4/13/98 22:05	60.427	0.205	4/13/98 20:05	50.006	28.62
4/13/98 22:09	60.445	0.01	4/13/98 20:09	51.909	26.675
4/13/98 22:13	60.464	-0.07	4/13/98 20:13	53.825	24.74
4/13/98 22:17	60.468	0.035	4/13/98 20:17	55.73	18.89
4/13/98 22:21	60.447	0.14	4/13/98 20:21	57.244	13.625
4/13/98 22:25	60.45	0.105	4/13/98 20:25	58.773	7.12
4/13/98 22:29	60.475	-0.025	4/13/98 20:29	59.508	4.2
4/13/98 22:33	60.475	-0.12	4/13/98 20:33	59.969	2.38
4/13/98 22:37	60.471	-0.095	4/13/98 20:37	60.197	1.455
4/13/98 22:41	60.47	0.095	4/13/98 20:41	60.348	0.79
4/13/98 22:45	60.451	0.105	4/13/98 20:45	60.445	0.59
4/13/98 22:49	60.452	0.115	4/13/98 20:49	60.488	0.43
4/13/98 22:53	60.489	-0.17	4/13/98 20:53	60.506	0.4
4/13/98 22:57	60.472	-0.165	4/13/98 20:57	60.563	0.1
4/13/98 23:01	60.475	-0.085	4/13/98 21:01	60.574	0.03
4/13/98 23:05	60.455	0.03	4/13/98 21:05	60.586	0.145
4/13/98 23:09	60.439	0.015	4/13/98 21:09	60.583	0.065
4/13/98 23:13	60.458	0.11	4/13/98 21:13	60.58	0.16
4/13/98 23:17	60.461	-0.1	4/13/98 21:17	60.615	-0.015
4/13/98 23:21	60.442	0.095	4/13/98 21:21	60.596	-0.015
4/13/98 23:25	60.48	-0.115	4/13/98 21:25	60.612	0.005
4/13/98 23:29	60.441	0.175	4/13/98 21:29	60.612	0.005
4/13/98 23:33	60.461	0.095	4/13/98 21:33	60.593	0.1
4/13/98 23:37	60.457	0.055	4/13/98 21:37	60.613	0.115
4/13/98 23:41	60.476	-0.04	4/13/98 21:41	60.613	0.115
4/13/98 23:45	60.48	-0.105	4/13/98 21:45	60.613	0.115
4/13/98 23:49	60.468	0.125	4/13/98 21:49	60.636	-0.075
4/13/98 23:53	60.468	0.175	4/13/98 21:53	60.636	0.015
4/13/98 23:57	60.459	0.16	4/13/98 21:57	60.636	0.11
4/14/98 0:01	60.493	-0.085	4/13/98 22:01	60.621	0.085
4/14/98 0:05	60.503	-0.12	4/13/98 22:05	60.639	0.11
4/14/98 0:09	60.491	-0.04	4/13/98 22:09	60.658	-0.09
4/14/98 0:13	60.476	-0.045	4/13/98 22:13	60.638	0.215
4/14/98 0:17	60.479	-0.025	4/13/98 22:17	60.661	0.035
4/14/98 0:21	60.483	-2.64	4/13/98 22:21	60.64	0.235
4/14/98 0:25	60.467	-7.955	4/13/98 22:25	60.681	-0.185
4/14/98 0:29	60.474	-13.395	4/13/98 22:29	60.668	0.075
4/14/98 0:33	59.955	-15.965	4/13/98 22:33	60.687	-0.215
4/14/98 0:37	58.876	-15.235	4/13/98 22:37	60.644	0.195
4/14/98 0:41	57.795	-13.86	4/13/98 22:41	60.683	-0.005
4/14/98 0:45	56.762	-12.64	4/13/98 22:45	60.644	0.105
4/14/98 0:49	55.829	-12.35	4/13/98 22:49	60.683	-0.075
4/14/98 0:53	55.023	-11.735	4/13/98 22:53	60.682	0.025
4/14/98 0:57	54.234	-14.05	4/13/98 22:57	60.665	-0.07
4/14/98 1:01	53.359	-14.97	4/13/98 23:01	60.668	-0.085
4/14/98 1:05	52.676	-19.555	4/13/98 23:05	60.687	-0.065
4/14/98 1:09	51.424	-14.78	4/13/98 23:09	60.651	0.21
4/14/98 1:13	50.365	-11.28	4/13/98 23:13	60.651	0.21
4/14/98 1:17	48.765	-4.19	4/13/98 23:17	60.674	-0.1

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4/14/98 1:21	48.468	-3.985	4/13/98 23:21	60.693	-0.295
4/14/98 1:25	48.109	-8.53	4/13/98 23:25	60.693	-0.215
4/14/98 1:29	47.927	-10.7	4/13/98 23:29	60.654	0.175
4/14/98 1:33	47.671	-17.375	4/13/98 23:33	60.634	0.195
4/14/98 1:37	46.403	-19.33	4/13/98 23:37	60.65	0.245
4/14/98 1:41	45.787	-24.85	4/13/98 23:41	60.689	-0.045
4/14/98 1:45	44.196	-26.03	4/13/98 23:45	60.673	0.09
4/14/98 1:49	42.537	-27.02	4/13/98 23:49	60.699	-0.065
4/14/98 1:53	40.817	-27.82	4/13/98 23:53	60.68	0.085
4/14/98 1:57	38.99	-28.23	4/13/98 23:57	60.691	-0.13
4/14/98 2:01	37.133	-28.515	4/14/98 0:01	60.686	0.01
4/14/98 2:05	35.253	-28.635	4/14/98 0:05	60.697	-0.125
4/14/98 2:09	33.344	-26.29	4/14/98 0:09	60.665	0.055
4/14/98 2:13	31.43	-24.16	4/14/98 0:13	60.688	-0.045
4/14/98 2:17	29.526	-21.695	4/14/98 0:17	60.672	0.075
4/14/98 2:21	28.086	-17.12	4/14/98 0:21	60.676	-3.99
4/14/98 2:25	26.598	-10.15	4/14/98 0:25	60.679	-9.985
4/14/98 2:29	25.187	-9.97	4/14/98 0:29	60.687	-17.375
4/14/98 2:33	24.662	-10.395	4/14/98 0:33	59.878	-22.1
4/14/98 2:37	24.568	-11.42	4/14/98 0:37	58.682	-25
4/14/98 2:41	23.193	-5.1	4/14/98 0:41	57.212	-26.89
4/14/98 2:45	22.583	-2.605	4/14/98 0:45	55.458	-27.4
4/14/98 2:49	22.284	-1.36	4/14/98 0:49	53.682	-27.86
4/14/98 2:53	22.173	-0.955	4/14/98 0:53	51.834	-28.31
4/14/98 2:57	22.062	-0.44	4/14/98 0:57	49.978	-28.65
4/14/98 3:01	22.012	-0.23	4/14/98 1:01	48.11	-28.965
4/14/98 3:05	21.982	-0.105	4/14/98 1:05	46.172	-28.805
4/14/98 3:09	21.974	0	4/14/98 1:09	44.248	-28.83
4/14/98 3:13	21.966	-0.025	4/14/98 1:13	42.317	-28.77
4/14/98 3:17	21.961	0.07	4/14/98 1:17	40.411	-28.57
4/14/98 3:21	21.974	-3.135	4/14/98 1:21	38.482	-28.67
4/14/98 3:25	21.961	-12.245	4/14/98 1:25	36.563	-28.975
4/14/98 3:29	21.975	-21.475	4/14/98 1:29	34.697	-29.375
4/14/98 3:33	21.347	-27.545	4/14/98 1:33	32.748	-27.445
4/14/98 3:37	19.512	-27.835	4/14/98 1:37	30.768	-25.815
4/14/98 3:41	17.68	-28.085	4/14/98 1:41	28.822	-22.395
4/14/98 3:45	15.838	-27.8	4/14/98 1:45	27.259	-17.585
4/14/98 3:49	13.945	-28.052	4/14/98 1:49	25.605	-10.995
4/14/98 3:53	12.063	-28.2735	4/14/98 1:53	24.343	-9.15
4/14/98 3:57	10.278	-29.1515	4/14/98 1:57	23.742	-7.505
4/14/98 4:01	8.3346	-28.8885	4/14/98 2:01	23.406	-6.545
4/14/98 4:05	6.4083	-28.2005	4/14/98 2:05	22.513	-2.72
4/14/98 4:09	4.4477	-28.1915	4/14/98 2:09	22.241	-1.48
4/14/98 4:13	2.5569	-28.6155	4/14/98 2:13	22.097	-0.9
4/14/98 4:17	0.76821	-29.2631	4/14/98 2:17	21.969	-0.4
4/14/98 4:21	-1.1906	-29.013	4/14/98 2:21	21.945	-0.42
4/14/98 4:25	-3.1662	-28.853	4/14/98 2:25	21.917	-0.13
4/14/98 4:29	-5.0844	-28.708	4/14/98 2:29	21.889	-0.13
4/14/98 4:33	-6.9932	-28.199	4/14/98 2:33	21.861	0.075

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4/14/98 4:37	-8.9368	-27.766	4/14/98 2:37	21.891	-0.32
4/14/98 4:41	-10.826	-28.155	4/14/98 2:41	21.863	-0.115
4/14/98 4:45	-12.633	-28.79	4/14/98 2:45	21.876	-0.11
4/14/98 4:49	-14.49	-29.24	4/14/98 2:49	21.827	-0.015
4/14/98 4:53	-16.457	-29.23	4/14/98 2:53	21.84	-0.225
4/14/98 4:57	-18.391	-28.18	4/14/98 2:57	21.854	-0.13
4/14/98 5:01	-20.338	-28.28	4/14/98 3:01	21.824	-0.125
4/14/98 5:05	-22.303	-21.145	4/14/98 3:05	21.795	0.105
4/14/98 5:09	-24.027	-23.47	4/14/98 3:09	21.828	-0.1
4/14/98 5:13	-25.994	-18.065	4/14/98 3:13	21.799	-0.025
4/14/98 5:17	-26.532	-16.955	4/14/98 3:17	21.816	-0.035
4/14/98 5:21	-28.721	-7.705	4/14/98 3:21	21.808	-3.865
4/14/98 5:25	-29.607	-3.895	4/14/98 3:25	21.794	-12.875
4/14/98 5:29	-29.923	1.76	4/14/98 3:29	21.809	-22.22
4/14/98 5:33	-30.262	3.09	4/14/98 3:33	21.035	-27.99
4/14/98 5:37	-30.386	4.21	4/14/98 3:37	19.219	-28.38
4/14/98 5:41	-29.571	-0.07	4/14/98 3:41	17.365	-28.53
4/14/98 5:45	-29.644	0.325	4/14/98 3:45	15.437	-27.6105
4/14/98 5:49	-29.544	-0.24	4/14/98 3:49	13.543	-28.0785
4/14/98 5:53	-29.585	-0.005	4/14/98 3:53	11.659	-28.5145
4/14/98 5:57	-29.579	-0.12	4/14/98 3:57	9.9149	-29.4985
4/14/98 6:01	-29.592	0.095	4/14/98 4:01	7.9273	-29.241
4/14/98 6:05	-29.586	0.07	4/14/98 4:05	5.9561	-28.5567
4/14/98 6:09	-29.603	-0.02	4/14/98 4:09	4.0152	-28.548
4/14/98 6:13	-29.573	-0.03	4/14/98 4:13	2.0791	-28.537
4/14/98 6:17	-29.572	-0.08	4/14/98 4:17	0.24477	-29.0779
4/14/98 6:21	-29.607	0.025	4/14/98 4:21	-1.6944	-29.0475
4/14/98 6:25	-29.579	-0.205	4/14/98 4:25	-3.6283	-29.108
4/14/98 6:29	-29.588	-0.135	4/14/98 4:29	-5.5708	-28.741
4/14/98 6:33	-29.602	-0.15	4/14/98 4:33	-7.5039	-28.5705
4/14/98 6:37	-29.62	0.105	4/14/98 4:37	-9.4499	-27.8005
4/14/98 6:41	-29.615	-0.1	4/14/98 4:41	-11.319	-28.3
4/14/98 6:45	-29.632	0.15	4/14/98 4:45	-13.218	-28.375
4/14/98 6:49	-29.599	-0.08	4/14/98 4:49	-15.01	-29.05
4/14/98 6:53	-29.635	0.195	4/14/98 4:53	-16.979	-29.73
4/14/98 6:57	-29.602	-0.015	4/14/98 4:57	-18.893	-29.14
4/14/98 7:01	-29.615	-0.365	4/14/98 5:01	-20.82	-29.825
4/14/98 7:05	-29.596	0.01	4/14/98 5:05	-22.925	-21.645
4/14/98 7:09	-29.605	0.45	4/14/98 5:09	-24.721	-24.1
4/14/98 7:13	-29.688	0.98	4/14/98 5:13	-26.785	-16.81
4/14/98 7:17	-29.594	0.18	4/14/98 5:17	-27.254	-16.28
4/14/98 7:21	-29.515	-0.15	4/14/98 5:21	-29.541	-5.955
4/14/98 7:25	-29.492	-0.215	4/14/98 5:25	-30.147	-3.43
4/14/98 7:29	-29.558	0.155	4/14/98 5:29	-30.51	3.635
4/14/98 7:33	-29.545	0.03	4/14/98 5:33	-30.732	3.56
4/14/98 7:37	-29.535	-0.075	4/14/98 5:37	-30.833	4.215
4/14/98 7:41	-29.527	-0.12	4/14/98 5:41	-29.783	-0.885
4/14/98 7:45	-29.539	-0.2	4/14/98 5:45	-30.02	0.445
4/14/98 7:49	-29.55	-0.075	4/14/98 5:49	-29.99	0.23

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4/14/98 7:53	-29.551	0.055	4/14/98 5:53	-29.96	0.11
4/14/98 7:57	-29.579	-0.07	4/14/98 5:57	-29.931	0.115
4/14/98 8:01	-29.565	-0.285	4/14/98 6:01	-29.944	0.095
4/14/98 8:05	-29.54	-0.25	4/14/98 6:05	-29.938	0.07
4/14/98 8:09	-29.593	0.015	4/14/98 6:09	-29.908	-0.02
4/14/98 8:13	-29.622	0.145	4/14/98 6:13	-29.925	-0.145
4/14/98 8:17	-29.59	-0.035	4/14/98 6:17	-29.924	0.035
4/14/98 8:21	-29.59	0.175	4/14/98 6:21	-29.912	-0.095
4/14/98 8:25	-29.593	0.17	4/14/98 6:25	-29.954	-0.09
4/14/98 8:29	-29.597	0.195	4/14/98 6:29	-29.917	-0.25
4/14/98 8:33	-29.555	0.12	4/14/98 6:33	-29.931	-0.15
4/14/98 8:37	-29.559	0.07	4/14/98 6:37	-29.972	0.225
4/14/98 8:41	-29.558	-0.01	4/14/98 6:41	-29.967	0.015
4/14/98 8:45	-29.531	-0.095	4/14/98 6:45	-29.961	0.035
4/14/98 8:49	-29.545	0.13	4/14/98 6:49	-29.927	-0.08
4/14/98 8:53	-29.56	0.105	4/14/98 6:53	-29.964	0.08
4/14/98 8:57	-29.55	0.05	4/14/98 6:57	-29.954	-0.01
4/14/98 9:01	-29.519	-0.105	4/14/98 7:01	-29.943	-0.37
4/14/98 9:05	-29.539	-0.085	4/14/98 7:05	-29.948	-0.11
4/14/98 9:09	-29.54	-0.06	4/14/98 7:09	-29.956	0.21
4/14/98 9:13	-29.54	-0.06	4/14/98 7:13	-30.017	0.4
4/14/98 9:17	-29.556	0.16	4/14/98 7:17	-29.97	0.065
4/14/98 9:21	-29.552	2.15	4/14/98 7:21	-29.914	-0.15
4/14/98 9:25	-29.552	8.575	4/14/98 7:25	-29.937	0.02
4/14/98 9:29	-29.524	17.175	4/14/98 7:29	-29.957	0.035
4/14/98 9:33	-29.122	24.05	4/14/98 7:33	-29.944	0.03
4/14/98 9:37	-27.837	26.69	4/14/98 7:37	-29.933	-0.195
4/14/98 9:41	-26.089	27.285	4/14/98 7:41	-29.95	-0.235
4/14/98 9:45	-24.312	27.845	4/14/98 7:45	-29.938	-0.2
4/14/98 9:49	-22.499	28.425	4/14/98 7:49	-29.972	-0.075
4/14/98 9:53	-20.632	28.695	4/14/98 7:53	-29.997	0.055
4/14/98 9:57	-18.743	28.67	4/14/98 7:57	-29.978	-0.07
4/14/98 10:01	-16.814	28.57	4/14/98 8:01	-29.987	-0.05
4/14/98 10:05	-14.893	28.381	4/14/98 8:05	-29.986	-0.015
4/14/98 10:09	-13.009	28.4305	4/14/98 8:09	-29.992	0.015
4/14/98 10:13	-11.1	28.301	4/14/98 8:13	-29.997	0.025
4/14/98 10:17	-9.2168	28.2455	4/14/98 8:17	-29.989	-0.035
4/14/98 10:21	-7.3229	28.2075	4/14/98 8:21	-29.989	0.18
4/14/98 10:25	-5.4398	28.18445	4/14/98 8:25	-29.992	0.055
4/14/98 10:29	-3.5677	28.286	4/14/98 8:29	-29.996	0.075
4/14/98 10:33	-1.6814	28.385	4/14/98 8:33	-29.953	-0.115
4/14/98 10:37	0.19709	28.30805	4/14/98 8:37	-29.981	-0.05
4/14/98 10:41	2.0895	28.317	4/14/98 8:41	-29.981	-0.36
4/14/98 10:45	3.9956	28.3525	4/14/98 8:45	-29.976	0.02
4/14/98 10:49	5.8587	28.5115	4/14/98 8:49	-29.991	-0.105
4/14/98 10:53	7.7529	28.6205	4/14/98 8:53	-30.053	0.225
4/14/98 10:57	9.6661	28.5195	4/14/98 8:57	-29.972	-0.07
4/14/98 11:01	11.561	28.435	4/14/98 9:01	-30.012	-0.105
4/14/98 11:05	13.477	28.3	4/14/98 9:05	-30.008	-0.085

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4/14/98 11:09	15.37	28.24	4/14/98 9:09	-29.986	-0.055
4/14/98 11:13	17.248	27.185	4/14/98 9:13	-30.033	0.06
4/14/98 11:17	19.137	20.76	4/14/98 9:17	-30.025	0.04
4/14/98 11:21	21.018	12.195	4/14/98 9:21	-29.997	1.445
4/14/98 11:25	22.685	4.99	4/14/98 9:25	-30.021	8.465
4/14/98 11:29	23.289	1.255	4/14/98 9:29	-30.017	17.315
4/14/98 11:33	23.457	-1.65	4/14/98 9:33	-29.708	24.78
4/14/98 11:37	23.683	-3.305	4/14/98 9:37	-28.328	27.185
4/14/98 11:41	23.54	-2.825	4/14/98 9:41	-26.554	27.315
4/14/98 11:45	23.127	-0.975	4/14/98 9:45	-24.752	27.76
4/14/98 11:49	23.022	-0.46	4/14/98 9:49	-22.891	27.885
4/14/98 11:53	22.975	-0.235	4/14/98 9:53	-21.091	28.615
4/14/98 11:57	22.932	0.37	4/14/98 9:57	-19.2	28.705
4/14/98 12:01	22.93	5.625	4/14/98 10:01	-17.314	28.49
4/14/98 12:05	22.928	13.26	4/14/98 10:05	-15.368	28.4125
4/14/98 12:09	23.006	21.315	4/14/98 10:09	-13.459	28.4585
4/14/98 12:13	24.055	25.31	4/14/98 10:13	-11.616	28.7795
4/14/98 12:17	25.58	26.765	4/14/98 10:17	-9.6855	28.4965
4/14/98 12:21	27.269	27.63	4/14/98 10:21	-7.7673	28.6755
4/14/98 12:25	29.117	27.815	4/14/98 10:25	-5.8601	28.7576
4/14/98 12:29	30.933	28.105	4/14/98 10:29	-3.9862	29.2915
4/14/98 12:33	32.795	28.15	4/14/98 10:33	-2.0322	28.8405
4/14/98 12:37	34.68	28.245	4/14/98 10:37	-0.10858	29.0819
4/14/98 12:41	36.554	28.34	4/14/98 10:41	1.8721	28.331
4/14/98 12:45	38.425	28.295	4/14/98 10:45	3.7359	28.6895
4/14/98 12:49	40.329	28.355	4/14/98 10:49	5.7078	28.306
4/14/98 12:53	42.222	28.23	4/14/98 10:53	7.5383	28.5285
4/14/98 12:57	44.084	28.37	4/14/98 10:57	9.4738	28.316
4/14/98 13:01	46	28.3	4/14/98 11:01	11.369	28.45
4/14/98 13:05	47.868	28.24	4/14/98 11:05	13.244	28.52
4/14/98 13:09	49.758	28.13	4/14/98 11:09	15.137	28.47
4/14/98 13:13	51.66	28.075	4/14/98 11:13	17.059	26.57
4/14/98 13:17	53.516	26.975	4/14/98 11:17	18.948	18.59
4/14/98 13:21	55.384	25.565	4/14/98 11:21	20.831	10.845
4/14/98 13:25	57.275	18.805	4/14/98 11:25	22.373	3.855
4/14/98 13:29	58.911	11.165	4/14/98 11:29	22.666	0.53
4/14/98 13:33	60.497	3.675	4/14/98 11:33	23	-2.585
4/14/98 13:37	61.036	1.115	4/14/98 11:37	23.144	-3.73
4/14/98 13:41	61.144	0.435	4/14/98 11:41	22.772	-2.105
4/14/98 13:45	61.232	-2.54	4/14/98 11:45	22.483	-0.875
4/14/98 13:49	61.259	-3.665	4/14/98 11:49	22.398	-0.355
4/14/98 13:53	61.231	-4.03	4/14/98 11:53	22.351	0.08
4/14/98 13:57	60.724	-1.715	4/14/98 11:57	22.308	1.83
4/14/98 14:01	60.526	-0.81	4/14/98 12:01	22.327	8.015
4/14/98 14:05	60.425	-0.39	4/14/98 12:05	22.367	15.55
4/14/98 14:09	60.381	-0.08	4/14/98 12:09	22.674	22.875
4/14/98 14:13	60.364	-0.115	4/14/98 12:13	23.93	25.625
4/14/98 14:17	60.347	-0.055	4/14/98 12:17	25.477	27.075
4/14/98 14:21	60.365	-0.09	4/14/98 12:21	27.249	27.625

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4/14/98 14:25	60.341	-0.03	4/14/98 12:25	29.055	28.025
4/14/98 14:29	60.336	-0.065	4/14/98 12:29	30.892	28.21
4/14/98 14:33	60.347	-0.165	4/14/98 12:33	32.774	28.255
4/14/98 14:37	60.335	-0.07	4/14/98 12:37	34.66	28.345
4/14/98 14:41	60.323	0.14	4/14/98 12:41	36.534	28.44
4/14/98 14:45	60.314	0.04	4/14/98 12:45	38.425	28.395
4/14/98 14:49	60.321	0.065	4/14/98 12:49	40.329	28.455
4/14/98 14:53	60.351	-0.125	4/14/98 12:53	42.222	28.43
4/14/98 14:57	60.322	0.095	4/14/98 12:57	44.104	28.465
4/14/98 15:01	60.334	0.075	4/14/98 13:01	46.02	28.495
4/14/98 15:05	60.326	-0.02	4/14/98 13:05	47.908	28.53
4/14/98 15:09	60.341	-0.06	4/14/98 13:09	49.797	28.715
4/14/98 15:13	60.349	0.05	4/14/98 13:13	51.719	28.755
4/14/98 15:17	60.322	0.05	4/14/98 13:17	53.614	26.97
4/14/98 15:21	60.329	0.19	4/14/98 13:21	55.54	25.555
4/14/98 15:25	60.359	0.16	4/14/98 13:25	57.47	16.675
4/14/98 15:29	60.332	0.175	4/14/98 13:29	59.008	7.01
4/14/98 15:33	60.367	-0.1	4/14/98 13:33	60.651	-1.63
4/14/98 15:37	60.391	-0.285	4/14/98 13:37	60.805	-2.655
4/14/98 15:41	60.367	-0.035	4/14/98 13:41	60.41	-0.82
4/14/98 15:45	60.347	0.005	4/14/98 13:45	60.325	-0.32
4/14/98 15:49	60.334	0.105	4/14/98 13:49	60.274	-0.38
4/14/98 15:53	60.36	-0.07	4/14/98 13:53	60.246	-0.265
4/14/98 15:57	60.348	0.06	4/14/98 13:57	60.261	-0.265
4/14/98 16:01	60.355	0	4/14/98 14:01	60.198	0.06
4/14/98 16:05	60.346	0.1	4/14/98 14:05	60.193	-0.1
4/14/98 16:09	60.36	-0.035	4/14/98 14:09	60.208	-0.18
4/14/98 16:13	60.355	-0.07	4/14/98 14:13	60.21	-0.12
4/14/98 16:17	60.366	-0.13	4/14/98 14:17	60.173	0.04
4/14/98 16:21	60.353	-0.025	4/14/98 14:21	60.172	0.2
4/14/98 16:25	60.341	-0.02	4/14/98 14:25	60.186	0.065
4/14/98 16:29	60.34	0.005	4/14/98 14:29	60.181	0.13
4/14/98 16:33	60.348	0.065	4/14/98 14:33	60.212	0.025
4/14/98 16:37	60.337	0.14	4/14/98 14:37	60.199	-0.16
4/14/98 16:41	60.341	0.14	4/14/98 14:41	60.207	-0.05
4/14/98 16:45	60.361	-0.055	4/14/98 14:45	60.217	-0.055
4/14/98 16:49	60.365	-0.075	4/14/98 14:49	60.167	0.16
4/14/98 16:53	60.369	-0.115	4/14/98 14:53	60.197	-0.125
4/14/98 16:57	60.35	0.105	4/14/98 14:57	60.206	0
4/14/98 17:01	60.35	-0.19	4/14/98 15:01	60.199	-0.02
4/14/98 17:05	60.346	-0.06	4/14/98 15:05	60.172	0.17
4/14/98 17:09	60.371	-0.17	4/14/98 15:09	60.206	0.135
4/14/98 17:13	60.312	0.215	4/14/98 15:13	60.195	0.05
4/14/98 17:17	60.334	0.105	4/14/98 15:17	60.206	0.05
4/14/98 17:21	60.337	0.105	4/14/98 15:21	60.233	-0.005
4/14/98 17:25	60.355	-2.96	4/14/98 15:25	60.205	0.16
4/14/98 17:29	60.355	-8.97	4/14/98 15:29	60.216	0.08
4/14/98 17:33	60.358	-17	4/14/98 15:33	60.232	-0.1
4/14/98 17:37	59.763	-22.975	4/14/98 15:37	60.237	-0.095

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4/14/98 17:41	58.561	-26.125	4/14/98 15:41	60.232	-0.035
4/14/98 17:45	56.958	-27.495	4/14/98 15:45	60.212	0.1
4/14/98 17:49	55.168	-28.045	4/14/98 15:49	60.218	0.105
4/14/98 17:53	53.336	-28.34	4/14/98 15:53	60.225	-0.07
4/14/98 17:57	51.459	-28.285	4/14/98 15:57	60.232	-0.035
4/14/98 18:01	49.559	-28.245	4/14/98 16:01	60.239	-0.095
4/14/98 18:05	47.668	-28.585	4/14/98 16:05	60.211	0
4/14/98 18:09	45.802	-28.66	4/14/98 16:09	60.225	-0.13
4/14/98 18:13	43.91	-28.81	4/14/98 16:13	60.22	0.025
4/14/98 18:17	41.951	-28.335	4/14/98 16:17	60.211	-0.03
4/14/98 18:21	40.07	-28.61	4/14/98 16:21	60.199	0.165
4/14/98 18:25	38.148	-28.575	4/14/98 16:25	60.225	-0.115
4/14/98 18:29	36.284	-28.97	4/14/98 16:29	60.205	-0.09
4/14/98 18:33	34.348	-28.96	4/14/98 16:33	60.232	-0.03
4/14/98 18:37	32.433	-24.745	4/14/98 16:37	60.202	0.14
4/14/98 18:41	30.49	-23.915	4/14/98 16:41	60.187	0.135
4/14/98 18:45	28.556	-19.035	4/14/98 16:45	60.226	0.04
4/14/98 18:49	27.484	-15.975	4/14/98 16:49	60.23	0.02
4/14/98 18:53	25.707	-8.165	4/14/98 16:53	60.214	0.18
4/14/98 18:57	24.749	-3.845	4/14/98 16:57	60.234	-0.09
4/14/98 19:01	24.289	-1.835	4/14/98 17:01	60.234	0
4/14/98 19:05	24.074	-0.815	4/14/98 17:05	60.25	0.03
4/14/98 19:09	23.98	-0.375	4/14/98 17:09	60.216	0.025
4/14/98 19:13	23.922	-0.245	4/14/98 17:13	60.234	-0.07
4/14/98 19:17	23.911	-0.245	4/14/98 17:17	60.256	-0.085
4/14/98 19:21	23.905	-0.185	4/14/98 17:21	60.221	0.01
4/14/98 19:25	23.873	0.02	4/14/98 17:25	60.22	-3.74
4/14/98 19:29	23.862	0.125	4/14/98 17:29	60.239	-10.52
4/14/98 19:33	23.868	-0.065	4/14/98 17:33	60.223	-18.85
4/14/98 19:37	23.877	-2.45	4/14/98 17:37	59.472	-24.25
4/14/98 19:41	23.887	-11.77	4/14/98 17:41	58.135	-26.93
4/14/98 19:45	23.855	-21.105	4/14/98 17:45	56.453	-28.115
4/14/98 19:49	23.387	-28.3	4/14/98 17:49	54.622	-28.175
4/14/98 19:53	21.533	-28.39	4/14/98 17:53	52.749	-28.375
4/14/98 19:57	19.634	-28.315	4/14/98 17:57	50.83	-28.215
4/14/98 20:01	17.727	-28.345	4/14/98 18:01	48.987	-28.57
4/14/98 20:05	15.855	-28.5	4/14/98 18:05	47.074	-28.515
4/14/98 20:09	13.971	-28.7655	4/14/98 18:09	45.187	-28.695
4/14/98 20:13	12.058	-28.584	4/14/98 18:13	43.273	-28.645
4/14/98 20:17	10.155	-28.735	4/14/98 18:17	41.371	-28.675
4/14/98 20:21	8.2179	-28.507	4/14/98 18:21	39.448	-28.545
4/14/98 20:25	6.3412	-28.7524	4/14/98 18:25	37.544	-28.815
4/14/98 20:29	4.408	-29.1975	4/14/98 18:29	35.636	-28.695
4/14/98 20:33	2.5165	-28.799	4/14/98 18:33	33.739	-28.79
4/14/98 20:37	0.59073	-28.5092	4/14/98 18:37	31.781	-24.575
4/14/98 20:41	-1.4315	-27.668	4/14/98 18:41	29.897	-24.15
4/14/98 20:45	-3.2433	-28.0315	4/14/98 18:45	27.981	-18.44
4/14/98 20:49	-5.1111	-28.0445	4/14/98 18:49	26.866	-14.75
4/14/98 20:53	-6.9651	-28.4145	4/14/98 18:53	25.067	-7.555

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4/14/98 20:57	-8.8496	-28.687	4/14/98 18:57	24.293	-4.365
4/14/98 21:01	-10.72	-28.945	4/14/98 19:01	23.916	-2.355
4/14/98 21:05	-12.648	-28.87	4/14/98 19:05	23.556	-0.61
4/14/98 21:09	-14.587	-28.785	4/14/98 19:09	23.42	0.04
4/14/98 21:13	-16.509	-28.855	4/14/98 19:13	23.445	-0.14
4/14/98 21:17	-18.422	-28.785	4/14/98 19:17	23.434	-0.035
4/14/98 21:21	-20.344	-28.64	4/14/98 19:21	23.428	0.125
4/14/98 21:25	-22.28	-21.735	4/14/98 19:25	23.417	0.02
4/14/98 21:29	-24.179	-22.02	4/14/98 19:29	23.427	0.015
4/14/98 21:33	-26.072	-18.16	4/14/98 19:33	23.453	-0.48
4/14/98 21:37	-26.627	-17.95	4/14/98 19:37	23.421	-0.38
4/14/98 21:41	-28.583	-9.145	4/14/98 19:41	23.43	-7.09
4/14/98 21:45	-29.704	-4.35	4/14/98 19:45	23.357	-16.21
4/14/98 21:49	-30.217	-1.875	4/14/98 19:49	23.345	-25.675
4/14/98 21:53	-30.412	-0.985	4/14/98 19:53	22.012	-28.575
4/14/98 21:57	-30.574	-0.38	4/14/98 19:57	20.115	-28.71
4/14/98 22:01	-30.592	-0.24	4/14/98 20:01	18.21	-28.845
4/14/98 22:05	-30.609	-0.22	4/14/98 20:05	16.297	-28.79
4/14/98 22:09	-30.65	0.09	4/14/98 20:09	14.373	-28.633
4/14/98 22:13	-30.64	-0.48	4/14/98 20:13	12.441	-28.24
4/14/98 22:17	-30.653	0.1	4/14/98 20:17	10.539	-28.3865
4/14/98 22:21	-30.632	0.16	4/14/98 20:21	8.6464	-28.588
4/14/98 22:25	-30.736	0.75	4/14/98 20:25	6.793	-29.1586
4/14/98 22:29	-30.633	0.185	4/14/98 20:29	4.8617	-29.1669
4/14/98 22:33	-30.6	0.14	4/14/98 20:33	2.9288	-28.4415
4/14/98 22:37	-30.586	-0.085	4/14/98 20:37	0.96128	-28.1539
4/14/98 22:41	-30.596	-0.055	4/14/98 20:41	-0.97167	-27.7492
4/14/98 22:45	-30.572	-0.31	4/14/98 20:45	-2.7595	-28.445
4/14/98 22:49	-30.603	-0.195	4/14/98 20:49	-4.6695	-28.3525
4/14/98 22:53	-30.607	-0.2	4/14/98 20:53	-6.5215	-28.7225
4/14/98 22:57	-30.634	-0.18	4/14/98 20:57	-8.4485	-28.8825
4/14/98 23:01	-30.642	-0.045	4/14/98 21:01	-10.34	-29.37
4/14/98 23:05	-30.647	0.08	4/14/98 21:05	-12.266	-29.41
4/14/98 23:09	-30.67	0.17	4/14/98 21:09	-14.225	-29.105
4/14/98 23:13	-30.651	0.075	4/14/98 21:13	-16.214	-28.945
4/14/98 23:17	-30.631	0.075	4/14/98 21:17	-18.148	-28.765
4/14/98 23:21	-30.636	-0.04	4/14/98 21:21	-20.046	-28.735
4/14/98 23:25	-30.636	0.035	4/14/98 21:25	-22.003	-26.38
4/14/98 23:29	-30.616	-0.23	4/14/98 21:29	-23.901	-18.97
4/14/98 23:33	-30.644	0.01	4/14/98 21:33	-25.793	-20.845
4/14/98 23:37	-30.629	-0.11	4/14/98 21:37	-27.279	-16.215
4/14/98 23:41	-30.662	0.01	4/14/98 21:41	-27.695	-15.58
4/14/98 23:45	-30.642	0.005	4/14/98 21:45	-29.962	-4.71
4/14/98 23:49	-30.651	0.145	4/14/98 21:49	-30.522	-1.995
4/14/98 23:53	-30.66	-0.065	4/14/98 21:53	-30.811	-0.99
4/14/98 23:57	-30.641	-0.065	4/14/98 21:57	-30.904	-0.495
4/15/98 0:01	-30.622	-0.18	4/14/98 22:01	-30.921	-0.475
4/15/98 0:05	-30.673	-0.035	4/14/98 22:05	-31.009	0.015
4/15/98 0:09	-30.654	-0.65	4/14/98 22:09	-31.003	-0.025

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4/15/98 0:13	-30.658	-0.33	4/14/98 22:13	-31.016	-0.25
4/15/98 0:17	-30.68	0.225	4/14/98 22:17	-31.006	-0.015
4/15/98 0:21	-30.784	0.7	4/14/98 22:21	-31.008	0.16
4/15/98 0:25	-30.724	0.705	4/14/98 22:25	-31.066	0.405
4/15/98 0:29	-30.635	0.1	4/14/98 22:29	-31.009	0.415
4/15/98 0:33	-30.644	0.305	4/14/98 22:33	-30.976	0.14
4/15/98 0:37	-30.583	-0.275	4/14/98 22:37	-30.985	0.38
4/15/98 0:41	-30.615	-0.125	4/14/98 22:41	-30.926	0.07
4/15/98 0:45	-30.583	-0.34	4/14/98 22:45	-30.948	0.16
4/15/98 0:49	-30.638	-0.08	4/14/98 22:49	-30.909	-0.08
4/15/98 0:53	-30.64	-0.09	4/14/98 22:53	-30.912	0.035
4/15/98 0:57	-30.651	-0.19	4/14/98 22:57	-30.916	-0.065
4/15/98 1:01	-30.654	-0.1	4/14/98 23:01	-30.925	0.08
4/15/98 1:05	-30.658	0.015	4/14/98 23:05	-30.905	-0.045
4/15/98 1:09	-30.689	0.01	4/14/98 23:09	-30.929	0.175
4/15/98 1:13	-30.674	0.15	4/14/98 23:13	-30.909	-0.045
4/15/98 1:17	-30.655	-0.085	4/14/98 23:17	-30.914	-0.04
4/15/98 1:21	-30.687	0.035	4/14/98 23:21	-30.894	-0.16
4/15/98 1:25	-30.644	0.01	4/14/98 23:25	-30.918	-0.32
4/15/98 1:29	-30.672	0.01	4/14/98 23:29	-30.922	-0.11
4/15/98 1:33	-30.68	-0.23	4/14/98 23:33	-30.926	0.005
4/15/98 1:37	-30.642	-0.11	4/14/98 23:37	-30.982	0.245
4/15/98 1:41	-30.67	5.035	4/14/98 23:41	-30.944	0.125
4/15/98 1:45	-30.726	13.7	4/14/98 23:45	-30.925	-0.105
4/15/98 1:49	-30.664	22.55	4/14/98 23:49	-30.933	0.03
4/15/98 1:53	-29.663	26.665	4/14/98 23:53	-30.919	-0.065
4/15/98 1:57	-27.986	27.495	4/14/98 23:57	-30.946	0.17
4/15/98 2:01	-26.154	27.715	4/15/98 0:01	-30.927	0.05
4/15/98 2:05	-24.33	27.84	4/15/98 0:05	-30.932	-0.505
4/15/98 2:09	-22.487	28.19	4/15/98 0:09	-30.912	-0.42
4/15/98 2:13	-20.611	28.425	4/15/98 0:13	-30.917	-0.325
4/15/98 2:17	-18.762	28.625	4/15/98 0:17	-31.033	0.58
4/15/98 2:21	-16.849	28.645	4/15/98 0:21	-30.996	0.35
4/15/98 2:25	-14.926	28.438	4/15/98 0:25	-30.982	0.47
4/15/98 2:29	-13.037	28.23	4/15/98 0:29	-30.917	0.095
4/15/98 2:33	-11.12	28.195	4/15/98 0:33	-30.926	0.185
4/15/98 2:37	-9.2384	28.1845	4/15/98 0:37	-30.888	-0.04
4/15/98 2:41	-7.391	28.5235	4/15/98 0:41	-30.898	-0.12
4/15/98 2:45	-5.481	28.28955	4/15/98 0:45	-30.889	-0.1
4/15/98 2:49	-3.6015	28.386	4/15/98 0:49	-30.896	-0.085
4/15/98 2:53	-1.6863	28.263	4/15/98 0:53	-30.922	0.03
4/15/98 2:57	0.17691	28.36045	4/15/98 0:57	-30.909	-0.08
4/15/98 3:01	2.0757	28.367	4/15/98 1:01	-30.913	-0.1
4/15/98 3:05	3.9663	28.355	4/15/98 1:05	-30.916	0.13
4/15/98 3:09	5.849	28.43	4/15/98 1:09	-30.925	0.015
4/15/98 3:13	7.7491	28.2945	4/15/98 1:13	-30.933	0.15
4/15/98 3:17	9.6373	28.2785	4/15/98 1:17	-30.89	-0.2
4/15/98 3:21	11.535	28.205	4/15/98 1:21	-30.922	-0.085
4/15/98 3:25	13.408	28.535	4/15/98 1:25	-30.903	-0.105

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4/15/98 3:29	15.293	27.19	4/15/98 1:29	-30.93	0.005
4/15/98 3:33	17.176	19.955	4/15/98 1:33	-30.939	-0.345
4/15/98 3:37	19.115	11.36	4/15/98 1:37	-30.924	0.01
4/15/98 3:41	20.731	4.295	4/15/98 1:41	-30.929	5.745
4/15/98 3:45	21.167	2.485	4/15/98 1:45	-31.008	15.11
4/15/98 3:49	21.387	1.425	4/15/98 1:49	-30.922	23.955
4/15/98 3:53	21.59	0.43	4/15/98 1:53	-29.78	27.595
4/15/98 3:57	21.664	0.285	4/15/98 1:57	-27.986	27.84
4/15/98 4:01	21.672	0.39	4/15/98 2:01	-26.131	27.83
4/15/98 4:05	21.676	0.33	4/15/98 2:05	-24.261	27.95
4/15/98 4:09	21.721	0.12	4/15/98 2:09	-22.418	28.3
4/15/98 4:13	21.75	4.045	4/15/98 2:13	-20.565	28.645
4/15/98 4:17	21.742	11.26	4/15/98 2:17	-18.671	28.735
4/15/98 4:21	21.745	19.555	4/15/98 2:21	-16.758	28.75
4/15/98 4:25	22.559	24.57	4/15/98 2:25	-14.836	28.657
4/15/98 4:29	23.994	26.65	4/15/98 2:29	-12.924	28.4425
4/15/98 4:33	25.656	27.73	4/15/98 2:33	-11.008	28.409
4/15/98 4:37	27.473	27.985	4/15/98 2:37	-9.1046	28.286
4/15/98 4:41	29.324	28.075	4/15/98 2:41	-7.2355	28.4035
4/15/98 4:45	31.202	28.085	4/15/98 2:45	-5.3262	28.49755
4/15/98 4:49	33.07	28.29	4/15/98 2:49	-3.4474	28.4845
4/15/98 4:53	34.939	28.345	4/15/98 2:53	-1.5548	28.471
4/15/98 4:57	36.819	28.405	4/15/98 2:57	0.37331	28.45545
4/15/98 5:01	38.728	28.31	4/15/98 3:01	2.2495	28.4635
4/15/98 5:05	40.608	28.36	4/15/98 3:05	4.1394	28.558
4/15/98 5:09	42.5	28.3	4/15/98 3:09	6.0644	28.523
4/15/98 5:13	44.39	28.315	4/15/98 3:13	7.9422	28.599
4/15/98 5:17	46.28	28.42	4/15/98 3:17	9.851	28.475
4/15/98 5:21	48.16	28.33	4/15/98 3:21	11.769	28.4
4/15/98 5:25	50.053	28.13	4/15/98 3:25	13.662	28.73
4/15/98 5:29	51.964	28.12	4/15/98 3:29	15.546	25.09
4/15/98 5:33	53.826	26.385	4/15/98 3:33	17.449	16.92
4/15/98 5:37	55.679	24.865	4/15/98 3:37	19.408	8.23
4/15/98 5:41	57.588	19.33	4/15/98 3:41	20.564	3.15
4/15/98 5:45	59.103	11.435	4/15/98 3:45	20.833	1.97
4/15/98 5:49	60.652	0.715	4/15/98 3:49	21.054	1.005
4/15/98 5:53	61.454	-4.535	4/15/98 3:53	21.194	0.43
4/15/98 5:57	61.39	-4.84	4/15/98 3:57	21.227	0.39
4/15/98 6:01	60.795	-2.215	4/15/98 4:01	21.255	0.185
4/15/98 6:05	60.547	-1.055	4/15/98 4:05	21.28	0.125
4/15/98 6:09	60.422	-0.53	4/15/98 4:09	21.305	0.115
4/15/98 6:13	60.352	-0.3	4/15/98 4:13	21.292	4.36
4/15/98 6:17	60.336	-0.02	4/15/98 4:17	21.305	11.68
4/15/98 6:21	60.316	-0.035	4/15/98 4:21	21.328	19.985
4/15/98 6:25	60.292	0.185	4/15/98 4:25	22.164	24.9
4/15/98 6:29	60.332	-0.015	4/15/98 4:29	23.641	26.88
4/15/98 6:33	60.309	0.025	4/15/98 4:33	25.325	27.855
4/15/98 6:37	60.329	-0.13	4/15/98 4:37	27.144	28.205
4/15/98 6:41	60.329	-0.085	4/15/98 4:41	29.017	28.29

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4/15/98 6:45	60.314	0.1	4/15/98 4:45	30.896	28.4
4/15/98 6:49	60.303	0.005	4/15/98 4:49	32.785	28.51
4/15/98 6:53	60.312	-0.075	4/15/98 4:53	34.675	28.46
4/15/98 6:57	60.334	-0.13	4/15/98 4:57	36.576	28.52
4/15/98 7:01	60.304	0.025	4/15/98 5:01	38.487	28.32
4/15/98 7:05	60.297	0.1	4/15/98 5:05	40.367	28.575
4/15/98 7:09	60.308	0.005	4/15/98 5:09	42.28	28.51
4/15/98 7:13	60.309	0.01	4/15/98 5:13	44.151	28.525
4/15/98 7:17	60.317	0.015	4/15/98 5:17	46.082	28.525
4/15/98 7:21	60.309	0.08	4/15/98 5:21	47.982	28.635
4/15/98 7:25	60.311	-0.04	4/15/98 5:25	49.856	28.825
4/15/98 7:29	60.32	-0.03	4/15/98 5:29	51.787	28.81
4/15/98 7:33	60.325	-0.095	4/15/98 5:33	53.709	26.97
4/15/98 7:37	60.303	0.085	4/15/98 5:37	55.621	25.635
4/15/98 7:41	60.314	0.105	4/15/98 5:41	57.549	19.525
4/15/98 7:45	60.306	0.025	4/15/98 5:45	59.103	11.145
4/15/98 7:49	60.32	0.045	4/15/98 5:49	60.748	-0.73
4/15/98 7:53	60.335	-0.17	4/15/98 5:53	61.454	-5.405
4/15/98 7:57	60.311	0.085	4/15/98 5:57	61.332	-5.42
4/15/98 8:01	60.329	-0.11	4/15/98 6:01	60.602	-2.025
4/15/98 8:05	60.301	0.11	4/15/98 6:05	60.373	-1.055
4/15/98 8:09	60.328	-0.065	4/15/98 6:09	60.248	-0.43
4/15/98 8:13	60.307	0.03	4/15/98 6:13	60.197	-0.3
4/15/98 8:17	60.323	-0.11	4/15/98 6:17	60.162	-0.02
4/15/98 8:21	60.315	-0.02	4/15/98 6:21	60.162	-0.13
4/15/98 8:25	60.313	-0.035	4/15/98 6:25	60.137	0.095
4/15/98 8:29	60.301	0.095	4/15/98 6:29	60.158	-0.015
4/15/98 8:33	60.311	0.08	4/15/98 6:33	60.136	-0.075
4/15/98 8:37	60.306	0.105	4/15/98 6:37	60.156	0.06
4/15/98 8:41	60.32	-0.08	4/15/98 6:41	60.155	-0.085
4/15/98 8:45	60.327	-0.035	4/15/98 6:45	60.121	0
4/15/98 8:49	60.327	-0.15	4/15/98 6:49	60.168	-0.285
4/15/98 8:53	60.304	0.045	4/15/98 6:53	60.138	0.02
4/15/98 8:57	60.32	-0.055	4/15/98 6:57	60.121	-0.03
4/15/98 9:01	60.297	0.095	4/15/98 7:01	60.111	0.12
4/15/98 9:05	60.313	0.015	4/15/98 7:05	60.142	-0.09
4/15/98 9:09	60.309	0.15	4/15/98 7:09	60.115	0.005
4/15/98 9:13	60.316	-0.06	4/15/98 7:13	60.135	-0.085
4/15/98 9:17	60.316	0.035	4/15/98 7:17	60.124	-0.085
4/15/98 9:21	60.339	0.09	4/15/98 7:21	60.116	-0.115
4/15/98 9:25	60.304	0.14	4/15/98 7:25	60.118	-0.14
4/15/98 9:29	60.323	-0.025	4/15/98 7:29	60.107	-0.125
4/15/98 9:33	60.357	-0.18	4/15/98 7:33	60.093	-0.095
4/15/98 9:37	60.332	-0.04	4/15/98 7:37	60.09	0.09
4/15/98 9:41	60.318	0.085	4/15/98 7:41	60.082	0.01
4/15/98 9:45	60.321	-1.73	4/15/98 7:45	60.074	0.12
4/15/98 9:49	60.324	-6.915	4/15/98 7:49	60.108	-0.055
4/15/98 9:53	60.335	-13.43	4/15/98 7:53	60.084	0.025
4/15/98 9:57	59.975	-19.76	4/15/98 7:57	60.098	-0.105

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4/15/98 10:01	58.941	-18.49	4/15/98 8:01	60.097	-0.205
4/15/98 10:05	57.649	-14.82	4/15/98 8:05	60.089	-0.085
4/15/98 10:09	56.023	-8.9	4/15/98 8:09	60.077	0.13
4/15/98 10:13	55.243	-6.9	4/15/98 8:13	60.056	0.225
4/15/98 10:17	54.685	-5.815	4/15/98 8:17	60.072	0.175
4/15/98 10:21	54.243	-5.02	4/15/98 8:21	60.103	-0.12
4/15/98 10:25	53.863	-4.43	4/15/98 8:25	60.101	-0.04
4/15/98 10:29	53.522	-4.145	4/15/98 8:29	60.107	-0.095
4/15/98 10:33	53.239	-3.97	4/15/98 8:33	60.079	0.08
4/15/98 10:37	52.977	-3.9	4/15/98 8:37	60.093	0.01
4/15/98 10:41	52.693	-3.525	4/15/98 8:41	60.088	0.02
4/15/98 10:45	52.445	-3.43	4/15/98 8:45	60.095	0.06
4/15/98 10:49	52.197	-6.08	4/15/98 8:49	60.095	0.045
4/15/98 10:53	51.988	-6.495	4/15/98 8:53	60.092	-0.055
4/15/98 10:57	51.759	-6.885	4/15/98 8:57	60.107	0.045
4/15/98 11:01	50.981	-4.535	4/15/98 9:01	60.104	-0.1
4/15/98 11:05	50.689	-3.02	4/15/98 9:05	60.081	0.115
4/15/98 11:09	50.382	-1.315	4/15/98 9:09	60.116	-0.14
4/15/98 11:13	50.074	0.1	4/15/98 9:13	60.084	-0.06
4/15/98 11:17	50.085	1.22	4/15/98 9:17	60.104	-0.16
4/15/98 11:21	50.119	-1.945	4/15/98 9:21	60.088	-0.105
4/15/98 11:25	50.094	-7.385	4/15/98 9:25	60.072	-0.055
4/15/98 11:29	50.329	-30.245	4/15/98 9:29	60.072	0.17
4/15/98 11:33	49.73	-32.42	4/15/98 9:33	60.067	0.015
4/15/98 11:37	48.617	-26.845	4/15/98 9:37	60.061	0.06
4/15/98 11:41	44.28	-8.65	4/15/98 9:41	60.106	-0.21
4/15/98 11:45	43.246	-4.475	4/15/98 9:45	60.07	-2.505
4/15/98 11:49	43.248	-8.795	4/15/98 9:49	60.073	-8.665
4/15/98 11:53	42.55	-13.185	4/15/98 9:53	60.064	-16.835
4/15/98 11:57	42.351	-20.535	4/15/98 9:57	59.569	-23.675
4/15/98 12:01	41.489	-25.305	4/15/98 10:01	58.34	-26.815
4/15/98 12:05	39.913	-26.675	4/15/98 10:05	56.697	-27.685
4/15/98 12:09	38.244	-27.78	4/15/98 10:09	54.834	-27.88
4/15/98 12:13	36.428	-28.385	4/15/98 10:13	52.977	-28.02
4/15/98 12:17	34.578	-28.865	4/15/98 10:17	51.16	-26.11
4/15/98 12:21	32.688	-29.075	4/15/98 10:21	49.258	-23.2
4/15/98 12:25	30.751	-25.07	4/15/98 10:25	47.373	-16
4/15/98 12:29	28.805	-23.4	4/15/98 10:29	45.938	-9.77
4/15/98 12:33	26.873	-17.305	4/15/98 10:33	44.618	-3.735
4/15/98 12:37	25.737	-13.275	4/15/98 10:37	44.173	-4.265
4/15/98 12:41	24.125	-6.97	4/15/98 10:41	43.984	-5.38
4/15/98 12:45	23.412	-4.67	4/15/98 10:45	43.871	-5.18
4/15/98 12:49	23.082	-3.655	4/15/98 10:49	43.32	-7.985
4/15/98 12:53	22.731	-2.125	4/15/98 10:53	42.908	-14.02
4/15/98 12:57	22.478	-0.98	4/15/98 10:57	42.835	-22.46
4/15/98 13:01	22.351	-0.325	4/15/98 11:01	41.723	-25.94
4/15/98 13:05	22.306	-0.305	4/15/98 11:05	40.104	-22.54
4/15/98 13:09	22.282	0.04	4/15/98 11:09	38.343	-22.68
4/15/98 13:13	22.286	-0.29	4/15/98 11:13	36.535	-16.92

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4/15/98 13:17	22.245	0.02	4/15/98 11:17	35.596	-13.76
4/15/98 13:21	22.29	-0.29	4/15/98 11:21	33.807	-5.47
4/15/98 13:25	22.228	3.055	4/15/98 11:25	33.151	-2.64
4/15/98 13:29	22.249	2.655	4/15/98 11:29	32.844	-6.185
4/15/98 13:33	22.232	2.26	4/15/98 11:33	32.713	-13.28
4/15/98 13:37	22.839	-1.17	4/15/98 11:37	32.623	-21.225
4/15/98 13:41	22.78	2.045	4/15/98 11:41	31.607	-25.505
4/15/98 13:45	22.684	3.645	4/15/98 11:45	30.057	-22.6
4/15/98 13:49	22.605	4.315	4/15/98 11:49	28.378	-23.22
4/15/98 13:53	23.189	-10.37	4/15/98 11:53	26.506	-17.765
4/15/98 13:57	23.413	-21.73	4/15/98 11:57	25.537	-14.585
4/15/98 14:01	23.468	-32.355	4/15/98 12:01	23.734	-6.405
4/15/98 14:05	21.115	-30.215	4/15/98 12:05	22.953	-2.955
4/15/98 14:09	19.067	-26.855	4/15/98 12:09	22.62	-1.5
4/15/98 14:13	16.997	-19.18	4/15/98 12:13	22.453	-0.77
4/15/98 14:17	15.072	-17.86	4/15/98 12:17	22.362	-0.315
4/15/98 14:21	13.696	-19.7185	4/15/98 12:21	22.32	-0.21
4/15/98 14:25	13.161	-26.3835	4/15/98 12:25	22.299	-0.01
4/15/98 14:29	11.5	-27.348	4/15/98 12:29	22.299	0
4/15/98 14:33	9.7523	-27.8275	4/15/98 12:33	22.278	0.065
4/15/98 14:37	7.8843	-27.831	4/15/98 12:37	22.297	-0.23
4/15/98 14:41	6.0304	-28.0332	4/15/98 12:41	22.299	-0.13
4/15/98 14:45	4.1868	-28.128	4/15/98 12:45	22.291	0
4/15/98 14:49	2.3181	-28.227	4/15/98 12:49	22.251	0.085
4/15/98 14:53	0.42377	-28.2114	4/15/98 12:53	22.273	0.06
4/15/98 14:57	-1.4388	-25.5465	4/15/98 12:57	22.291	0.06
4/15/98 15:01	-3.3273	-26.221	4/15/98 13:01	22.268	0.195
4/15/98 15:05	-5.2185	-27.6025	4/15/98 13:05	22.285	-0.1
4/15/98 15:09	-6.5481	-30.9845	4/15/98 13:09	22.303	-0.065
4/15/98 15:13	-8.5715	-30.5875	4/15/98 13:13	22.307	-0.085
4/15/98 15:17	-10.739	-29.56	4/15/98 13:17	22.265	0.13
4/15/98 15:21	-12.745	-29.04	4/15/98 13:21	22.29	-0.29
4/15/98 15:25	-14.689	-27.52	4/15/98 13:25	22.29	-2.04
4/15/98 15:29	-16.651	-24.295	4/15/98 13:29	22.291	-4.73
4/15/98 15:33	-18.553	-22.84	4/15/98 13:33	22.232	-5.645
4/15/98 15:37	-20.193	-20.71	4/15/98 13:37	21.882	-4.4
4/15/98 15:41	-21.51	-17.91	4/15/98 13:41	21.345	-1.39
4/15/98 15:45	-23.121	-24.03	4/15/98 13:45	21.103	0.11
4/15/98 15:49	-24.335	-22.62	4/15/98 13:49	21.002	-4.635
4/15/98 15:53	-25.092	-21.14	4/15/98 13:53	21.067	-13.03
4/15/98 15:57	-27.927	-8.825	4/15/98 13:57	21.125	-21.94
4/15/98 16:01	-28.859	-3.775	4/15/98 14:01	20.075	-26.035
4/15/98 16:05	-29.32	-1.53	4/15/98 14:05	18.461	-22.755
4/15/98 16:09	-29.692	0.575	4/15/98 14:09	16.737	-23.27
4/15/98 16:13	-29.614	0.075	4/15/98 14:13	14.868	-20.76
4/15/98 16:17	-29.626	0.09	4/15/98 14:17	13.91	-25.0695
4/15/98 16:21	-29.577	-0.08	4/15/98 14:21	12.083	-25.474
4/15/98 16:25	-29.599	-0.255	4/15/98 14:25	10.716	-28.145
4/15/98 16:29	-29.608	-0.225	4/15/98 14:29	8.8961	-28.2645

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4/15/98 16:33	-29.593	-0.2	4/15/98 14:33	6.9882	-28.2195
4/15/98 16:37	-29.65	0.045	4/15/98 14:37	5.087	-27.7899
4/15/98 16:41	-29.653	0.02	4/15/98 14:41	3.2432	-27.9935
4/15/98 16:45	-29.633	-0.215	4/15/98 14:45	1.3443	-28.2025
4/15/98 16:49	-29.641	-0.12	4/15/98 14:49	-0.47097	-29.0747
4/15/98 16:53	-29.649	-0.145	4/15/98 14:53	-2.3555	-28.6175
4/15/98 16:57	-29.676	-0.075	4/15/98 14:57	-4.2962	-28.399
4/15/98 17:01	-29.665	-0.1	4/15/98 15:01	-6.2859	-27.9755
4/15/98 17:05	-29.678	-0.025	4/15/98 15:05	-8.079	-28.69
4/15/98 17:09	-29.691	-0.07	4/15/98 15:09	-9.976	-29.315
4/15/98 17:13	-29.685	-0.3	4/15/98 15:13	-11.881	-29.24
4/15/98 17:17	-29.683	-0.155	4/15/98 15:17	-13.817	-28.755
4/15/98 17:21	-29.705	0.07	4/15/98 15:21	-15.839	-28.455
4/15/98 17:25	-29.745	0.39	4/15/98 15:25	-17.729	-28.65
4/15/98 17:29	-29.714	0.265	4/15/98 15:29	-19.568	-29.22
4/15/98 17:33	-29.691	0.08	4/15/98 15:33	-21.53	-23.59
4/15/98 17:37	-29.667	0.01	4/15/98 15:37	-23.459	-22.63
4/15/98 17:41	-29.661	-0.065	4/15/98 15:41	-25.412	-19.025
4/15/98 17:45	-29.675	0.055	4/15/98 15:45	-26.248	-16.94
4/15/98 17:49	-29.665	-0.23	4/15/98 15:49	-27.985	-9.175
4/15/98 17:53	-29.674	-0.01	4/15/98 15:53	-29.217	-3.45
4/15/98 17:57	-29.664	-0.025	4/15/98 15:57	-29.636	-2.395
4/15/98 18:01	-29.711	0.035	4/15/98 16:01	-29.82	-0.965
4/15/98 18:05	-29.676	0.01	4/15/98 16:05	-29.907	-0.47
4/15/98 18:09	-29.669	-0.09	4/15/98 16:09	-30.115	0.46
4/15/98 18:13	-29.704	-0.02	4/15/98 16:13	-30.013	0.43
4/15/98 18:17	-29.674	-0.17	4/15/98 16:17	-30.001	0.325
4/15/98 18:21	-29.687	0.03	4/15/98 16:21	-30.023	0.51
4/15/98 18:25	-29.708	0.15	4/15/98 16:25	-29.927	0.095
4/15/98 18:29	-29.708	-1.105	4/15/98 16:29	-29.936	0.125
4/15/98 18:33	-29.681	-0.385	4/15/98 16:33	-29.921	0.035
4/15/98 18:37	-29.678	-0.09	4/15/98 16:37	-29.908	-0.07
4/15/98 18:41	-29.929	1.475	4/15/98 16:41	-29.911	-0.095
4/15/98 18:45	-29.758	0.715	4/15/98 16:45	-29.914	-0.22
4/15/98 18:49	-29.696	0.41	4/15/98 16:49	-29.922	0.23
4/15/98 18:53	-29.634	0.12	4/15/98 16:53	-29.93	0.085
4/15/98 18:57	-29.615	-0.05	4/15/98 16:57	-29.958	0.165
4/15/98 19:01	-29.614	0.345	4/15/98 17:01	-29.876	-0.335
4/15/98 19:05	-29.61	0.035	4/15/98 17:05	-29.913	-0.025
4/15/98 19:09	-29.625	0.295	4/15/98 17:09	-29.925	0.045
4/15/98 19:13	-29.545	-0.18	4/15/98 17:13	-29.943	-0.185
4/15/98 19:17	-29.603	0.175	4/15/98 17:17	-29.918	-0.035
4/15/98 19:21	-29.566	-0.08	4/15/98 17:21	-29.916	-0.165
4/15/98 19:25	-29.581	-0.08	4/15/98 17:25	-29.98	0.395
4/15/98 19:29	-29.568	-0.24	4/15/98 17:29	-29.925	-0.09
4/15/98 19:33	-29.582	-0.265	4/15/98 17:33	-29.949	0.08
4/15/98 19:37	-29.597	-0.19	4/15/98 17:37	-29.901	-0.11
4/15/98 19:41	-29.616	-0.8	4/15/98 17:41	-29.943	-0.065
4/15/98 19:45	-29.635	-0.14	4/15/98 17:45	-29.933	0.055

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4/15/98 19:49	-29.635	-0.065	4/15/98 17:49	-29.923	-0.23
4/15/98 19:53	-29.776	0.615	4/15/98 17:53	-29.956	-0.005
4/15/98 19:57	-29.663	6.14	4/15/98 17:57	-29.922	-0.14
4/15/98 20:01	-29.648	15.28	4/15/98 18:01	-29.969	0.035
4/15/98 20:05	-29.653	24.5	4/15/98 18:05	-29.957	-0.11
4/15/98 20:09	-28.435	27.905	4/15/98 18:09	-29.95	-0.09
4/15/98 20:13	-26.592	28.05	4/15/98 18:13	-29.962	-0.02
4/15/98 20:17	-24.753	28.42	4/15/98 18:17	-29.979	-0.05
4/15/98 20:21	-22.854	28.2	4/15/98 18:21	-29.968	0.025
4/15/98 20:25	-20.982	28.545	4/15/98 18:25	-29.966	-0.205
4/15/98 20:29	-19.069	28.28	4/15/98 18:29	-29.989	-1.345
4/15/98 20:33	-17.214	28.4	4/15/98 18:33	-29.963	-0.735
4/15/98 20:37	-15.273	28.0035	4/15/98 18:37	-30.007	-0.325
4/15/98 20:41	-13.413	28.1945	4/15/98 18:41	-30.258	1.245
4/15/98 20:45	-11.534	28.241	4/15/98 18:45	-30.11	0.715
4/15/98 20:49	-9.6723	28.319	4/15/98 18:49	-30.072	0.645
4/15/98 20:53	-7.7741	28.2065	4/15/98 18:53	-30.009	0.235
4/15/98 20:57	-5.8858	28.20915	4/15/98 18:57	-29.967	-0.165
4/15/98 21:01	-4.0085	28.3125	4/15/98 19:01	-29.943	-0.24
4/15/98 21:05	-2.1328	28.3815	4/15/98 19:05	-29.962	0.27
4/15/98 21:09	-0.24397	28.47085	4/15/98 19:09	-30	0.295
4/15/98 21:13	1.654	28.366	4/15/98 19:13	-29.991	-0.06
4/15/98 21:17	3.5435	28.3905	4/15/98 19:17	-29.908	0.06
4/15/98 21:21	5.4502	28.374	4/15/98 19:21	-29.941	0.035
4/15/98 21:25	7.3272	28.489	4/15/98 19:25	-30.003	0.27
4/15/98 21:29	9.2216	28.372	4/15/98 19:29	-29.896	-0.125
4/15/98 21:33	11.125	28.4	4/15/98 19:33	-29.934	-0.03
4/15/98 21:37	13.025	28.385	4/15/98 19:37	-29.949	0.045
4/15/98 21:41	14.896	28.48	4/15/98 19:41	-29.921	-0.8
4/15/98 21:45	16.805	27.705	4/15/98 19:45	-29.94	-0.495
4/15/98 21:49	18.702	22.265	4/15/98 19:49	-29.94	0.05
4/15/98 21:53	20.592	13.46	4/15/98 19:53	-30.081	0.85
4/15/98 21:57	22.346	5.755	4/15/98 19:57	-30.039	7.435
4/15/98 22:01	23.155	1.835	4/15/98 20:01	-29.93	16.225
4/15/98 22:05	23.284	-1.815	4/15/98 20:05	-29.911	25.67
4/15/98 22:09	23.497	-3.4	4/15/98 20:09	-28.552	28.145
4/15/98 22:13	23.522	-3.94	4/15/98 20:13	-26.685	28.17
4/15/98 22:17	22.921	-0.99	4/15/98 20:17	-24.777	28.315
4/15/98 22:21	22.817	-0.56	4/15/98 20:21	-22.923	28.545
4/15/98 22:25	22.734	-0.145	4/15/98 20:25	-21.051	28.665
4/15/98 22:29	22.723	2.77	4/15/98 20:29	-19.114	28.055
4/15/98 22:33	22.705	10.105	4/15/98 20:33	-17.214	28.175
4/15/98 22:37	22.705	18.38	4/15/98 20:37	-15.318	28.2285
4/15/98 22:41	23.277	24.695	4/15/98 20:41	-13.503	28.6445
4/15/98 22:45	24.726	26.505	4/15/98 20:45	-11.579	28.466
4/15/98 22:49	26.381	27.545	4/15/98 20:49	-9.6723	28.4295
4/15/98 22:53	28.216	27.625	4/15/98 20:53	-7.7741	28.5355
4/15/98 22:57	30.027	28.015	4/15/98 20:57	-5.8858	28.64605
4/15/98 23:01	31.89	28.095	4/15/98 21:01	-3.9864	28.528

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4/15/98 23:05	33.741	28.3	4/15/98 21:05	-2.067	28.5935
4/15/98 23:09	35.63	28.305	4/15/98 21:09	-0.15659	28.46495
4/15/98 23:13	37.509	28.39	4/15/98 21:13	1.7192	28.4695
4/15/98 23:17	39.401	28.3	4/15/98 21:17	3.6517	28.491
4/15/98 23:21	41.291	28.27	4/15/98 21:21	5.5364	28.583
4/15/98 23:25	43.187	28.3	4/15/98 21:25	7.4131	28.5895
4/15/98 23:29	45.061	28.375	4/15/98 21:29	9.3499	28.4705
4/15/98 23:33	46.945	28.35	4/15/98 21:33	11.253	28.495
4/15/98 23:37	48.847	28.03	4/15/98 21:37	13.131	28.485
4/15/98 23:41	50.736	27.445	4/15/98 21:41	15.044	28.68
4/15/98 23:45	52.615	26.425	4/15/98 21:45	16.952	27.175
4/15/98 23:49	54.453	22.975	4/15/98 21:49	18.828	19.455
4/15/98 23:53	56.225	17.045	4/15/98 21:53	20.78	10.965
4/15/98 23:57	57.9	10.19	4/15/98 21:57	22.387	3.475
4/16/98 0:01	59.048	5.205	4/15/98 22:01	22.719	2.15
4/16/98 0:05	59.634	2.66	4/15/98 22:05	22.973	1.09
4/16/98 0:09	59.938	1.33	4/15/98 22:09	23.082	0.545
4/16/98 0:13	60.089	0.705	4/15/98 22:13	23.149	0.21
4/16/98 0:17	60.166	0.355	4/15/98 22:17	23.191	0.15
4/16/98 0:21	60.204	0.26	4/15/98 22:21	23.191	-0.04
4/16/98 0:25	60.23	0.225	4/15/98 22:25	23.191	0.27
4/16/98 0:29	60.237	0.27	4/15/98 22:29	23.221	4.325
4/16/98 0:33	60.256	0.06	4/15/98 22:33	23.183	12.055
4/16/98 0:37	60.275	0.165	4/15/98 22:37	23.245	20.42
4/16/98 0:41	60.291	-0.035	4/15/98 22:41	24.086	25.37
4/16/98 0:45	60.268	0.07	4/15/98 22:45	25.594	27.175
4/16/98 0:49	60.308	-0.11	4/15/98 22:49	27.329	27.895
4/16/98 0:53	60.284	-0.17	4/15/98 22:53	29.16	28.185
4/16/98 0:57	60.282	-0.135	4/15/98 22:57	31.029	28.265
4/16/98 1:01	60.286	0.06	4/15/98 23:01	32.908	28.345
4/16/98 1:05	60.25	0.25	4/15/98 23:05	34.797	28.335
4/16/98 1:09	60.255	0.11	4/15/98 23:09	36.682	28.54
4/16/98 1:13	60.298	-0.125	4/15/98 23:13	38.577	28.53
4/16/98 1:17	60.3	-0.155	4/15/98 23:17	40.464	28.645
4/16/98 1:21	60.277	0.055	4/15/98 23:21	42.39	28.41
4/16/98 1:25	60.273	-0.005	4/15/98 23:25	44.283	28.435
4/16/98 1:29	60.269	0.015	4/15/98 23:29	46.193	28.51
4/16/98 1:33	60.288	0.11	4/15/98 23:33	48.072	28.685
4/16/98 1:37	60.272	0.115	4/15/98 23:37	49.97	28.85
4/16/98 1:41	60.272	0.015	4/15/98 23:41	51.895	26.8
4/16/98 1:45	60.31	-0.19	4/15/98 23:45	53.809	24.82
4/16/98 1:49	60.295	-0.02	4/15/98 23:49	55.74	18.38
4/16/98 1:53	60.275	-0.06	4/15/98 23:53	57.255	12.375
4/16/98 1:57	60.272	-0.04	4/15/98 23:57	58.773	5.345
4/16/98 2:01	60.291	-0.205	4/16/98 0:01	59.416	2.495
4/16/98 2:05	60.263	0.03	4/16/98 0:05	59.73	1.02
4/16/98 2:09	60.264	0.125	4/16/98 0:09	59.842	0.65
4/16/98 2:13	60.25	0.18	4/16/98 0:13	59.915	0.32
4/16/98 2:17	60.269	0.085	4/16/98 0:17	59.934	0.26

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4/16/98 2:21	60.289	-0.09	4/16/98 0:21	59.972	0.07
4/16/98 2:25	60.286	0.02	4/16/98 0:25	59.979	0.035
4/16/98 2:29	60.286	0.02	4/16/98 0:29	59.986	-0.02
4/16/98 2:33	60.271	0.22	4/16/98 0:33	59.986	0.155
4/16/98 2:37	60.29	-0.095	4/16/98 0:37	59.986	0.16
4/16/98 2:41	60.29	-0.1	4/16/98 0:41	59.982	0.06
4/16/98 2:45	60.315	-0.13	4/16/98 0:45	60.017	-0.03
4/16/98 2:49	60.271	0.105	4/16/98 0:49	60.018	0.08
4/16/98 2:53	60.27	0.205	4/16/98 0:53	59.994	0.025
4/16/98 2:57	60.289	0.13	4/16/98 0:57	60.011	-0.035
4/16/98 3:01	60.292	-0.01	4/16/98 1:01	60.034	-0.13
4/16/98 3:05	60.311	-0.1	4/16/98 1:05	59.999	-0.04
4/16/98 3:09	60.315	-0.255	4/16/98 1:09	60.004	0.11
4/16/98 3:13	60.29	-0.12	4/16/98 1:13	60.008	-0.03
4/16/98 3:17	60.291	-0.215	4/16/98 1:17	59.991	0.135
4/16/98 3:21	60.264	0.12	4/16/98 1:21	60.026	-0.14
4/16/98 3:25	60.266	0.29	4/16/98 1:25	60.002	0
4/16/98 3:29	60.248	0.265	4/16/98 1:29	60.018	0.015
4/16/98 3:33	60.288	-0.02	4/16/98 1:33	59.998	0.015
4/16/98 3:37	60.324	-0.085	4/16/98 1:37	60.002	0.11
4/16/98 3:41	60.301	-0.095	4/16/98 1:41	60.021	-0.08
4/16/98 3:45	60.284	-0.015	4/16/98 1:45	60.001	0
4/16/98 3:49	60.307	-0.06	4/16/98 1:49	60.024	-0.115
4/16/98 3:53	60.282	-0.05	4/16/98 1:53	60.005	-0.06
4/16/98 3:57	60.281	0.055	4/16/98 1:57	60.001	0.06
4/16/98 4:01	60.295	-0.08	4/16/98 2:01	60.001	-0.015
4/16/98 4:05	60.272	-5.495	4/16/98 2:05	59.993	0.03
4/16/98 4:09	60.292	-14.64	4/16/98 2:09	60.013	-0.07
4/16/98 4:13	60.279	-24.015	4/16/98 2:13	59.998	0.09
4/16/98 4:17	59.173	-27.96	4/16/98 2:17	59.999	0.085
4/16/98 4:21	57.364	-28.62	4/16/98 2:21	59.999	0.005
4/16/98 4:25	55.476	-28.75	4/16/98 2:25	60.016	-0.08
4/16/98 4:29	53.581	-29.025	4/16/98 2:29	60.016	-0.175
4/16/98 4:33	51.64	-28.89	4/16/98 2:33	60	0.03
4/16/98 4:37	49.726	-28.82	4/16/98 2:37	60	0.005
4/16/98 4:41	47.776	-28.605	4/16/98 2:41	59.981	0.095
4/16/98 4:45	45.862	-28.505	4/16/98 2:45	60.006	-0.13
4/16/98 4:49	43.962	-28.49	4/16/98 2:49	60.001	0.105
4/16/98 4:53	42.055	-28.54	4/16/98 2:53	60	0.01
4/16/98 4:57	40.161	-28.685	4/16/98 2:57	59.98	0.125
4/16/98 5:01	38.264	-28.755	4/16/98 3:01	60.022	-0.205
4/16/98 5:05	36.347	-28.76	4/16/98 3:05	60.002	-0.005
4/16/98 5:09	34.424	-28.69	4/16/98 3:09	60.005	-0.055
4/16/98 5:13	32.513	-28.735	4/16/98 3:13	59.981	0.075
4/16/98 5:17	30.595	-28.655	4/16/98 3:17	60.001	-0.02
4/16/98 5:21	28.686	-28.755	4/16/98 3:21	59.994	0.02
4/16/98 5:25	26.766	-28.71	4/16/98 3:25	59.996	-0.005
4/16/98 5:29	24.864	-28.835	4/16/98 3:29	59.997	-0.025
4/16/98 5:33	22.935	-28.67	4/16/98 3:33	59.998	-0.02

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4/16/98 5:37	21.024	-28.635	4/16/98 3:37	59.995	0.11
4/16/98 5:41	19.097	-28.58	4/16/98 3:41	59.992	0
4/16/98 5:45	17.201	-28.615	4/16/98 3:45	59.994	0.08
4/16/98 5:49	15.297	-28.639	4/16/98 3:49	60.017	-0.25
4/16/98 5:53	13.381	-28.6245	4/16/98 3:53	59.992	0.045
4/16/98 5:57	11.478	-28.6295	4/16/98 3:57	60.01	-0.04
4/16/98 6:01	9.5692	-28.6665	4/16/98 4:01	59.967	0.305
4/16/98 6:05	7.6561	-28.5675	4/16/98 4:05	60.001	-4.43
4/16/98 6:09	5.7521	-28.5081	4/16/98 4:09	60.002	-13.285
4/16/98 6:13	3.8359	-28.5525	4/16/98 4:13	60.028	-23.15
4/16/98 6:17	1.9426	-28.6425	4/16/98 4:17	59.115	-28.55
4/16/98 6:21	0.050474	-28.6004	4/16/98 4:21	57.345	-29.41
4/16/98 6:25	-1.8746	-28.538	4/16/98 4:25	55.398	-29.345
4/16/98 6:29	-3.7859	-28.5515	4/16/98 4:29	53.405	-28.84
4/16/98 6:33	-5.6696	-28.632	4/16/98 4:33	51.463	-28.6
4/16/98 6:37	-7.5822	-28.499	4/16/98 4:37	49.529	-28.435
4/16/98 6:41	-9.4962	-28.469	4/16/98 4:41	47.637	-28.51
4/16/98 6:45	-11.396	-28.69	4/16/98 4:45	45.743	-28.715
4/16/98 6:49	-13.282	-28.7	4/16/98 4:49	43.842	-28.695
4/16/98 6:53	-15.19	-28.74	4/16/98 4:53	41.935	-28.85
4/16/98 6:57	-17.134	-28.785	4/16/98 4:57	40	-28.595
4/16/98 7:01	-19.022	-28.7	4/16/98 5:01	38.103	-28.765
4/16/98 7:05	-20.938	-28.675	4/16/98 5:05	36.165	-28.465
4/16/98 7:09	-22.891	-19.175	4/16/98 5:09	34.281	-28.59
4/16/98 7:13	-24.762	-21.74	4/16/98 5:13	32.35	-28.64
4/16/98 7:17	-26.673	-16.295	4/16/98 5:17	30.472	-28.765
4/16/98 7:21	-26.726	-18.035	4/16/98 5:21	28.563	-28.76
4/16/98 7:25	-29.11	-7.015	4/16/98 5:25	26.622	-28.615
4/16/98 7:29	-29.932	-3.39	4/16/98 5:29	24.719	-28.635
4/16/98 7:33	-30.333	-1.69	4/16/98 5:33	22.811	-28.785
4/16/98 7:37	-30.513	-0.82	4/16/98 5:37	20.899	-28.75
4/16/98 7:41	-30.61	-0.56	4/16/98 5:41	18.992	-28.69
4/16/98 7:45	-30.671	-0.01	4/16/98 5:45	17.054	-28.625
4/16/98 7:49	-30.677	1.54	4/16/98 5:49	15.149	-28.54
4/16/98 7:53	-30.722	3.28	4/16/98 5:53	13.254	-28.9555
4/16/98 7:57	-30.673	2.575	4/16/98 5:57	11.329	-28.962
4/16/98 8:01	-30.369	-0.325	4/16/98 6:01	9.441	-29.108
4/16/98 8:05	-30.066	-2.45	4/16/98 6:05	7.4629	-28.6885
4/16/98 8:09	-30.158	-2.32	4/16/98 6:09	5.5366	-28.741
4/16/98 8:13	-30.434	-0.85	4/16/98 6:13	3.6194	-28.457
4/16/98 8:17	-30.556	-0.27	4/16/98 6:17	1.7252	-28.7675
4/16/98 8:21	-30.622	0.095	4/16/98 6:21	-0.2116	-28.618
4/16/98 8:25	-30.604	-0.22	4/16/98 6:25	-2.072	-28.996
4/16/98 8:29	-30.61	-0.175	4/16/98 6:29	-4.0283	-28.791
4/16/98 8:33	-30.603	-0.06	4/16/98 6:33	-5.9352	-28.649
4/16/98 8:37	-30.648	0.34	4/16/98 6:37	-7.8712	-28.519
4/16/98 8:41	-30.645	0.36	4/16/98 6:41	-9.7865	-28.4875
4/16/98 8:45	-30.615	0.16	4/16/98 6:45	-11.665	-28.48
4/16/98 8:49	-30.58	-0.13	4/16/98 6:49	-13.575	-28.495

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4/16/98 8:53	-30.573	-0.18	4/16/98 6:53	-15.484	-28.535
4/16/98 8:57	-30.583	-0.185	4/16/98 6:57	-17.361	-28.8
4/16/98 9:01	-30.606	-0.1	4/16/98 7:01	-19.274	-28.6
4/16/98 9:05	-30.609	-0.025	4/16/98 7:05	-21.191	-28.575
4/16/98 9:09	-30.62	-0.165	4/16/98 7:09	-23.121	-20.59
4/16/98 9:13	-30.626	-0.18	4/16/98 7:13	-24.994	-22.57
4/16/98 9:17	-30.614	-0.345	4/16/98 7:17	-26.906	-16.89
4/16/98 9:21	-30.653	-0.155	4/16/98 7:21	-27.239	-17.23
4/16/98 9:25	-30.662	0.1	4/16/98 7:25	-29.508	-6.67
4/16/98 9:29	-30.683	0.04	4/16/98 7:29	-30.284	-3.395
4/16/98 9:33	-30.684	0.115	4/16/98 7:33	-30.685	-1.46
4/16/98 9:37	-30.642	-0.02	4/16/98 7:37	-30.842	-0.59
4/16/98 9:41	-30.675	-0.02	4/16/98 7:41	-30.963	-0.09
4/16/98 9:45	-30.661	-0.11	4/16/98 7:45	-30.977	0.11
4/16/98 9:49	-30.646	0.005	4/16/98 7:49	-30.96	2.25
4/16/98 9:53	-30.679	-0.325	4/16/98 7:53	-30.981	3.4
4/16/98 9:57	-30.683	0.005	4/16/98 7:57	-30.955	2.34
4/16/98 10:01	-30.645	-0.09	4/16/98 8:01	-30.51	-0.915
4/16/98 10:05	-30.744	0.385	4/16/98 8:05	-30.301	-2.565
4/16/98 10:09	-30.682	-1.155	4/16/98 8:09	-30.487	-1.965
4/16/98 10:13	-30.663	-0.355	4/16/98 8:13	-30.693	-1.085
4/16/98 10:17	-30.667	0.035	4/16/98 8:17	-30.814	-0.395
4/16/98 10:21	-30.913	1.2	4/16/98 8:21	-30.88	-0.265
4/16/98 10:25	-30.734	0.495	4/16/98 8:25	-30.91	0.255
4/16/98 10:29	-30.66	-0.145	4/16/98 8:29	-30.893	0.065
4/16/98 10:33	-30.673	0.3	4/16/98 8:33	-30.933	0.3
4/16/98 10:37	-30.635	0.15	4/16/98 8:37	-30.859	-0.25
4/16/98 10:41	-30.689	0.345	4/16/98 8:41	-30.88	-0.11
4/16/98 10:45	-30.613	0.005	4/16/98 8:45	-30.873	-0.2
4/16/98 10:49	-30.605	0.005	4/16/98 8:49	-30.909	0.105
4/16/98 10:53	-30.62	0.005	4/16/98 8:53	-30.902	0.055
4/16/98 10:57	-30.612	-0.025	4/16/98 8:57	-30.913	0.055
4/16/98 11:01	-30.604	-0.155	4/16/98 9:01	-30.888	0.015
4/16/98 11:05	-30.619	0.05	4/16/98 9:05	-30.891	-0.025
4/16/98 11:09	-30.617	-0.09	4/16/98 9:09	-30.902	-0.165
4/16/98 11:13	-30.635	-0.17	4/16/98 9:13	-30.885	-0.18
4/16/98 11:17	-30.609	-0.26	4/16/98 9:17	-30.896	-0.11
4/16/98 11:21	-30.635	-0.085	4/16/98 9:21	-30.935	-0.04
4/16/98 11:25	-30.669	-1.54	4/16/98 9:25	-30.921	-0.135
4/16/98 11:29	-30.661	2.435	4/16/98 9:29	-30.918	-0.08
4/16/98 11:33	-30.652	8.625	4/16/98 9:33	-30.943	0
4/16/98 11:37	-30.977	18.565	4/16/98 9:37	-30.948	-0.14
4/16/98 11:41	-30.174	23.57	4/16/98 9:41	-30.934	-0.02
4/16/98 11:45	-28.927	26.57	4/16/98 9:45	-30.943	-0.115
4/16/98 11:49	-27.264	29.675	4/16/98 9:49	-30.976	0.125
4/16/98 11:53	-25.46	28.32	4/16/98 9:53	-30.938	-0.325
4/16/98 11:57	-23.613	21.015	4/16/98 9:57	-30.966	0.01
4/16/98 12:01	-21.329	11.525	4/16/98 10:01	-30.951	-0.09
4/16/98 12:05	-19.796	10.35	4/16/98 10:05	-31.003	-0.085

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4/16/98 12:09	-19.41	16.365	4/16/98 10:09	-30.964	-0.57
4/16/98 12:13	-19.024	23.385	4/16/98 10:13	-30.969	0.12
4/16/98 12:17	-17.726	26.505	4/16/98 10:17	-31.02	0.385
4/16/98 12:21	-16.137	29.89	4/16/98 10:21	-31.078	0.73
4/16/98 12:25	-14.347	24.332	4/16/98 10:25	-30.945	0.37
4/16/98 12:29	-12.425	16.401	4/16/98 10:29	-30.943	0.21
4/16/98 12:33	-10.159	5.7465	4/16/98 10:33	-30.932	0.18
4/16/98 12:37	-9.4806	2.363	4/16/98 10:37	-30.871	-0.2
4/16/98 12:41	-9.1448	0.7215	4/16/98 10:41	-30.901	-0.005
4/16/98 12:45	-9.0097	0.8085	4/16/98 10:45	-30.896	0.125
4/16/98 12:49	-9.008	6.593	4/16/98 10:49	-30.911	0.12
4/16/98 12:53	-9.0005	14.308	4/16/98 10:53	-30.902	-0.115
4/16/98 12:57	-8.848	22.1745	4/16/98 10:57	-30.871	-0.26
4/16/98 13:01	-7.6894	25.4165	4/16/98 11:01	-30.887	-0.385
4/16/98 13:05	-6.1389	29.04645	4/16/98 11:05	-30.925	0.05
4/16/98 13:09	-4.4131	25.25025	4/16/98 11:09	-30.923	-0.205
4/16/98 13:13	-2.6061	20.8205	4/16/98 11:13	-30.964	-0.055
4/16/98 13:17	-0.32961	17.83055	4/16/98 11:17	-30.915	-0.14
4/16/98 13:21	0.63695	21.79025	4/16/98 11:21	-30.964	-0.085
4/16/98 13:25	1.558	26.051	4/16/98 11:25	-30.975	-0.95
4/16/98 13:29	3.2365	28.463	4/16/98 11:29	-30.943	1.97
4/16/98 13:33	4.995	28.54	4/16/98 11:33	-30.981	9.22
4/16/98 13:37	6.7682	20.319	4/16/98 11:37	-31.165	18.69
4/16/98 13:41	8.9291	11.1495	4/16/98 11:41	-30.549	24.75
4/16/98 13:45	10.703	7.6	4/16/98 11:45	-29.137	27.04
4/16/98 13:49	10.832	14.575	4/16/98 11:49	-27.427	30.03
4/16/98 13:53	11.159	21.595	4/16/98 11:53	-25.599	26.61
4/16/98 13:57	12.223	25.205	4/16/98 11:57	-23.729	19.08
4/16/98 14:01	13.747	27.02	4/16/98 12:01	-21.421	10.045
4/16/98 14:05	15.478	27.655	4/16/98 12:05	-20.277	11.615
4/16/98 14:09	17.264	24.36	4/16/98 12:09	-19.913	18.31
4/16/98 14:13	19.151	15.255	4/16/98 12:13	-19.412	24.985
4/16/98 14:17	21.009	7.205	4/16/98 12:17	-17.954	28.205
4/16/98 14:21	22.136	2.165	4/16/98 12:21	-16.251	30.125
4/16/98 14:25	22.202	2.66	4/16/98 12:25	-14.415	22.662
4/16/98 14:29	22.45	7.035	4/16/98 12:29	-12.313	13.4975
4/16/98 14:33	22.569	14.465	4/16/98 12:33	-10.226	3.516
4/16/98 14:37	22.734	22.56	4/16/98 12:37	-9.8826	1.919
4/16/98 14:41	23.857	26.085	4/16/98 12:41	-9.6135	0.834
4/16/98 14:45	25.462	27.35	4/16/98 12:45	-9.5228	2.0365
4/16/98 14:49	27.246	27.87	4/16/98 12:49	-9.4988	8.6025
4/16/98 14:53	29.074	28.05	4/16/98 12:53	-9.4467	16.4285
4/16/98 14:57	30.932	28.23	4/16/98 12:57	-9.1155	23.733
4/16/98 15:01	32.82	28.16	4/16/98 13:01	-7.7783	26.7395
4/16/98 15:05	34.684	28.275	4/16/98 13:05	-6.161	28.61055
4/16/98 15:09	36.578	28.225	4/16/98 13:09	-4.3689	23.3934
4/16/98 15:13	38.452	28.325	4/16/98 13:13	-2.4304	21.5735
4/16/98 15:17	40.339	28.345	4/16/98 13:17	-0.43889	20.32695
4/16/98 15:21	42.223	28.4	4/16/98 13:21	0.30978	25.6921

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4/16/98 15:25	44.117	28.27	4/16/98 13:25	1.8843	27.213
4/16/98 15:29	46.008	28.125	4/16/98 13:29	3.6265	29.507
4/16/98 15:33	47.903	28.07	4/16/98 13:33	5.4482	24.459
4/16/98 15:37	49.771	28.185	4/16/98 13:37	7.3269	16.3555
4/16/98 15:41	51.633	26.745	4/16/98 13:41	9.5279	6.6605
4/16/98 15:45	53.517	25.35	4/16/98 13:45	10.34	8.99
4/16/98 15:49	55.408	19.915	4/16/98 13:49	10.598	15.955
4/16/98 15:53	56.982	14.03	4/16/98 13:53	10.86	23.51
4/16/98 15:57	58.587	7.235	4/16/98 13:57	12.138	26.155
4/16/98 16:01	59.391	3.655	4/16/98 14:01	13.789	27.645
4/16/98 16:05	59.788	2.03	4/16/98 14:05	15.562	27.755
4/16/98 16:09	60.034	1.065	4/16/98 14:09	17.369	21.34
4/16/98 16:13	60.122	0.68	4/16/98 14:13	19.318	12.96
4/16/98 16:17	60.194	0.37	4/16/98 14:17	21.113	4.29
4/16/98 16:21	60.247	0.065	4/16/98 14:21	21.637	1.75
4/16/98 16:25	60.258	0.14	4/16/98 14:25	21.91	2.46
4/16/98 16:29	60.268	0.11	4/16/98 14:29	21.971	9.325
4/16/98 16:33	60.26	0.15	4/16/98 14:33	21.987	17.685
4/16/98 16:37	60.286	0.1	4/16/98 14:37	22.402	24.63
4/16/98 16:41	60.29	-0.035	4/16/98 14:41	23.836	26.905
4/16/98 16:45	60.29	0.14	4/16/98 14:45	25.524	27.755
4/16/98 16:49	60.306	-0.135	4/16/98 14:49	27.328	28.275
4/16/98 16:53	60.283	0.06	4/16/98 14:53	29.217	28.25
4/16/98 16:57	60.318	-0.02	4/16/98 14:57	31.075	28.425
4/16/98 17:01	60.279	0.06	4/16/98 15:01	32.983	28.25
4/16/98 17:05	60.295	0.175	4/16/98 15:05	34.867	28.365
4/16/98 17:09	60.314	-0.035	4/16/98 15:09	36.76	28.415
4/16/98 17:13	60.291	0.08	4/16/98 15:13	38.633	28.615
4/16/98 17:17	60.33	-0.22	4/16/98 15:17	40.54	28.63
4/16/98 17:21	60.307	-0.1	4/16/98 15:21	42.443	28.68
4/16/98 17:25	60.307	0.1	4/16/98 15:25	44.356	28.555
4/16/98 17:29	60.286	-0.005	4/16/98 15:29	46.266	28.505
4/16/98 17:33	60.287	0.09	4/16/98 15:33	48.179	28.45
4/16/98 17:37	60.327	-0.1	4/16/98 15:37	50.067	28.75
4/16/98 17:41	60.285	0.085	4/16/98 15:41	51.967	26.73
4/16/98 17:45	60.305	0.195	4/16/98 15:45	53.869	24.755
4/16/98 17:49	60.307	0.05	4/16/98 15:49	55.817	17.87
4/16/98 17:53	60.302	0.15	4/16/98 15:53	57.313	11.895
4/16/98 17:57	60.344	-0.06	4/16/98 15:57	58.82	5.01
4/16/98 18:01	60.317	-0.025	4/16/98 16:01	59.391	2.205
4/16/98 18:05	60.332	-0.09	4/16/98 16:05	59.692	0.87
4/16/98 18:09	60.332	-0.04	4/16/98 16:09	59.822	0.195
4/16/98 18:13	60.312	-0.06	4/16/98 16:13	59.832	0.295
4/16/98 18:17	60.314	0.025	4/16/98 16:17	59.866	0.08
4/16/98 18:21	60.324	-0.125	4/16/98 16:21	59.861	0.16
4/16/98 18:25	60.3	0.07	4/16/98 16:25	59.891	0.045
4/16/98 18:29	60.319	0.055	4/16/98 16:29	59.882	0.01
4/16/98 18:33	60.299	0.135	4/16/98 16:33	59.893	-0.045
4/16/98 18:37	60.314	0.04	4/16/98 16:37	59.9	-0.195

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4/16/98 18:41	60.33	-0.075	4/16/98 16:41	59.884	-0.035
4/16/98 18:45	60.326	0.025	4/16/98 16:45	59.884	0.04
4/16/98 18:49	60.322	0.025	4/16/98 16:49	59.861	0.06
4/16/98 18:53	60.315	0.14	4/16/98 16:53	59.877	-0.035
4/16/98 18:57	60.331	-0.17	4/16/98 16:57	59.892	-0.015
4/16/98 19:01	60.327	-0.075	4/16/98 17:01	59.873	0.16
4/16/98 19:05	60.343	-0.195	4/16/98 17:05	59.87	0.075
4/16/98 19:09	60.297	0.14	4/16/98 17:09	59.889	-0.035
4/16/98 19:13	60.312	-0.03	4/16/98 17:13	59.905	-0.115
4/16/98 19:17	60.304	0.015	4/16/98 17:17	59.885	-0.025
4/16/98 19:21	60.325	0.015	4/16/98 17:21	59.882	-0.1
4/16/98 19:25	60.306	0.07	4/16/98 17:25	59.882	0.1
4/16/98 19:29	60.307	0.065	4/16/98 17:29	59.88	0
4/16/98 19:33	60.328	-0.065	4/16/98 17:33	59.862	0.185
4/16/98 19:37	60.32	-0.125	4/16/98 17:37	59.902	-0.005
4/16/98 19:41	60.32	-0.13	4/16/98 17:41	59.88	-0.015
4/16/98 19:45	60.315	0.02	4/16/98 17:45	59.899	-0.19
4/16/98 19:49	60.295	0.04	4/16/98 17:49	59.901	0.05
4/16/98 19:53	60.294	0.16	4/16/98 17:53	59.877	0.055
4/16/98 19:57	60.319	-0.125	4/16/98 17:57	59.861	0.135
4/16/98 20:01	60.303	-0.03	4/16/98 18:01	59.911	-0.02
4/16/98 20:05	60.326	-2.56	4/16/98 18:05	59.888	0.1
4/16/98 20:09	60.294	-10.85	4/16/98 18:09	59.888	0.055
4/16/98 20:13	60.297	-20.005	4/16/98 18:13	59.907	-0.06
4/16/98 20:17	59.814	-27.435	4/16/98 18:17	59.908	-0.07
4/16/98 20:21	58.124	-28.8	4/16/98 18:21	59.899	-0.03
4/16/98 20:25	56.296	-29.395	4/16/98 18:25	59.895	0.07
4/16/98 20:29	54.327	-29.045	4/16/98 18:29	59.894	0.055
4/16/98 20:33	52.364	-28.62	4/16/98 18:33	59.893	-0.055
4/16/98 20:37	50.417	-28.43	4/16/98 18:37	59.909	0.035
4/16/98 20:41	48.518	-28.415	4/16/98 18:41	59.905	-0.075
4/16/98 20:45	46.64	-28.54	4/16/98 18:45	59.882	0.02
4/16/98 20:49	44.731	-28.585	4/16/98 18:49	59.916	-0.07
4/16/98 20:53	42.835	-28.605	4/16/98 18:53	59.89	0.04
4/16/98 20:57	40.932	-28.605	4/16/98 18:57	59.886	0.025
4/16/98 21:01	39.014	-28.6	4/16/98 19:01	59.902	-0.17
4/16/98 21:05	37.114	-28.655	4/16/98 19:05	59.898	-0.095
4/16/98 21:09	35.211	-28.605	4/16/98 19:09	59.891	0.14
4/16/98 21:13	33.294	-28.825	4/16/98 19:13	59.868	0.16
4/16/98 21:17	31.383	-28.815	4/16/98 19:17	59.879	0.015
4/16/98 21:21	29.49	-28.915	4/16/98 19:21	59.919	-0.18
4/16/98 21:25	27.529	-28.725	4/16/98 19:25	59.9	-0.025
4/16/98 21:29	25.62	-28.745	4/16/98 19:29	59.882	0.065
4/16/98 21:33	23.707	-28.755	4/16/98 19:33	59.883	0.13
4/16/98 21:37	21.784	-28.515	4/16/98 19:37	59.895	0.065
4/16/98 21:41	19.871	-28.615	4/16/98 19:41	59.895	-0.035
4/16/98 21:45	17.956	-28.535	4/16/98 19:45	59.909	0.025
4/16/98 21:49	16.081	-28.69	4/16/98 19:49	59.908	0.045
4/16/98 21:53	14.148	-28.598	4/16/98 19:53	59.888	-0.035

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4/16/98 21:57	12.249	-28.589	4/16/98 19:57	59.914	-0.13
4/16/98 22:01	10.343	-28.6325	4/16/98 20:01	59.917	-0.225
4/16/98 22:05	8.4284	-28.6405	4/16/98 20:05	59.881	-3.53
4/16/98 22:09	6.5312	-28.6706	4/16/98 20:09	59.888	-12.31
4/16/98 22:13	4.6165	-28.676	4/16/98 20:13	59.872	-22.265
4/16/98 22:17	2.7003	-28.477	4/16/98 20:17	59.175	-29.025
4/16/98 22:21	0.79708	-28.7639	4/16/98 20:21	57.426	-30.015
4/16/98 22:25	-1.1187	-28.5555	4/16/98 20:25	55.419	-29.34
4/16/98 22:29	-2.9951	-28.5875	4/16/98 20:29	53.37	-28.505
4/16/98 22:33	-4.9557	-28.3765	4/16/98 20:33	51.423	-28.38
4/16/98 22:37	-6.8298	-28.641	4/16/98 20:37	49.551	-28.48
4/16/98 22:41	-8.7126	-28.792	4/16/98 20:41	47.669	-28.765
4/16/98 22:45	-10.631	-28.835	4/16/98 20:45	45.747	-28.585
4/16/98 22:49	-12.558	-28.675	4/16/98 20:49	43.855	-28.63
4/16/98 22:53	-14.471	-28.765	4/16/98 20:53	41.916	-28.555
4/16/98 22:57	-16.398	-28.69	4/16/98 20:57	40.03	-28.655
4/16/98 23:01	-18.293	-28.71	4/16/98 21:01	38.129	-28.75
4/16/98 23:05	-20.224	-28.59	4/16/98 21:05	36.205	-28.605
4/16/98 23:09	-22.136	-17.695	4/16/98 21:09	34.299	-28.655
4/16/98 23:13	-24.035	-20.975	4/16/98 21:13	32.379	-28.88
4/16/98 23:17	-25.942	-15.155	4/16/98 21:17	30.484	-28.865
4/16/98 23:21	-25.675	-18.465	4/16/98 21:21	28.568	-28.87
4/16/98 23:25	-28.23	-6.665	4/16/98 21:25	26.603	-28.575
4/16/98 23:29	-28.973	-3.315	4/16/98 21:29	24.711	-28.805
4/16/98 23:33	-29.368	-1.47	4/16/98 21:33	22.794	-28.705
4/16/98 23:37	-29.563	-0.505	4/16/98 21:37	20.888	-28.78
4/16/98 23:41	-29.636	-0.365	4/16/98 21:41	18.95	-28.565
4/16/98 23:45	-29.662	-0.24	4/16/98 21:45	17.053	-28.805
4/16/98 23:49	-29.664	-0.215	4/16/98 21:49	15.132	-28.537
4/16/98 23:53	-29.709	-0.09	4/16/98 21:53	13.237	-28.654
4/16/98 23:57	-29.71	0.065	4/16/98 21:57	11.292	-28.4345
4/17/98 0:01	-29.707	-0.05	4/16/98 22:01	9.4246	-28.7995
4/17/98 0:05	-29.727	0.09	4/16/98 22:05	7.5062	-28.918
4/17/98 0:09	-29.697	-0.02	4/16/98 22:09	5.6051	-28.8404
4/17/98 0:13	-29.717	0.115	4/16/98 22:13	3.6647	-28.958
4/17/98 0:17	-29.709	0.135	4/16/98 22:17	1.7226	-28.541
4/17/98 0:21	-29.701	0.255	4/16/98 22:21	-0.16298	-28.8281
4/17/98 0:25	-29.694	0.02	4/16/98 22:25	-2.1269	-28.512
4/17/98 0:29	-29.682	0.14	4/16/98 22:29	-3.9856	-28.878
4/17/98 0:33	-29.65	0.02	4/16/98 22:33	-5.9286	-28.102
4/17/98 0:37	-29.69	0.045	4/16/98 22:37	-7.8293	-28.0335
4/17/98 0:41	-29.654	-0.315	4/16/98 22:41	-9.7612	-27.849
4/17/98 0:45	-29.646	-0.005	4/16/98 22:45	-11.549	-28.335
4/17/98 0:49	-29.681	0.155	4/16/98 22:49	-13.436	-28.62
4/17/98 0:53	-29.717	0.345	4/16/98 22:53	-15.331	-28.59
4/17/98 0:57	-29.647	0	4/16/98 22:57	-17.216	-28.635
4/17/98 1:01	-29.65	0.07	4/16/98 23:01	-19.16	-28.425
4/17/98 1:05	-29.648	-0.12	4/16/98 23:05	-21.049	-25.515
4/17/98 1:09	-29.647	0.04	4/16/98 23:09	-22.943	-18.31

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4/17/98 1:13	-29.636	-0.085	4/16/98 23:13	-24.845	-20.55
4/17/98 1:17	-29.672	0.045	4/16/98 23:17	-26.152	-16.565
4/17/98 1:21	-29.639	-0.22	4/16/98 23:21	-26.605	-15.34
4/17/98 1:25	-29.653	-0.07	4/16/98 23:25	-28.955	-4.215
4/17/98 1:29	-29.663	-0.175	4/16/98 23:29	-29.465	-1.915
4/17/98 1:33	-29.683	0.14	4/16/98 23:33	-29.673	-0.885
4/17/98 1:37	-29.667	-0.195	4/16/98 23:37	-29.798	-0.385
4/17/98 1:41	-29.698	-0.04	4/16/98 23:41	-29.848	-0.125
4/17/98 1:45	-29.655	-0.135	4/16/98 23:45	-29.85	-0.12
4/17/98 1:49	-29.706	0.12	4/16/98 23:49	-29.875	0.135
4/17/98 1:53	-29.706	0.025	4/16/98 23:53	-29.873	0.14
4/17/98 1:57	-29.682	-0.07	4/16/98 23:57	-29.874	0.065
4/17/98 2:01	-29.682	-0.05	4/17/98 0:01	-29.848	-0.165
4/17/98 2:05	-29.701	-0.05	4/17/98 0:05	-29.845	-0.14
4/17/98 2:09	-29.696	-0.075	4/17/98 0:09	-29.861	-0.025
4/17/98 2:13	-29.692	-0.095	4/17/98 0:13	-29.881	0.115
4/17/98 2:17	-29.711	0.14	4/17/98 0:17	-29.873	0.02
4/17/98 2:21	-29.711	-0.125	4/17/98 0:21	-29.866	0.14
4/17/98 2:25	-29.711	0.02	4/17/98 0:25	-29.858	0.02
4/17/98 2:29	-29.683	-0.23	4/17/98 0:29	-29.869	0.135
4/17/98 2:33	-29.736	0.135	4/17/98 0:33	-29.838	-0.095
4/17/98 2:37	-29.707	0.09	4/17/98 0:37	-29.854	-0.075
4/17/98 2:41	-29.729	0.18	4/17/98 0:41	-29.842	-0.315
4/17/98 2:45	-29.709	-0.06	4/17/98 0:45	-29.857	-0.12
4/17/98 2:49	-29.689	-0.06	4/17/98 0:49	-29.869	0.04
4/17/98 2:53	-29.693	-0.06	4/17/98 0:53	-29.905	0.23
4/17/98 2:57	-29.721	0.035	4/17/98 0:57	-29.881	0.47
4/17/98 3:01	-29.701	-0.105	4/17/98 1:01	-29.861	0.185
4/17/98 3:05	-29.705	-0.015	4/17/98 1:05	-29.859	0.235
4/17/98 3:09	-29.714	-0.13	4/17/98 1:09	-29.787	-0.2
4/17/98 3:13	-29.722	0.24	4/17/98 1:13	-29.824	-0.085
4/17/98 3:17	-29.708	-0.085	4/17/98 1:17	-29.812	-0.31
4/17/98 3:21	-29.74	4.04	4/17/98 1:21	-29.827	-0.335
4/17/98 3:25	-29.674	12.955	4/17/98 1:25	-29.841	-0.065
4/17/98 3:29	-29.725	22.395	4/17/98 1:29	-29.874	0.06
4/17/98 3:33	-28.932	27.705	4/17/98 1:33	-29.894	0.14
4/17/98 3:37	-27.083	27.835	4/17/98 1:37	-29.854	-0.2
4/17/98 3:41	-25.246	28.115	4/17/98 1:41	-29.862	-0.04
4/17/98 3:45	-23.391	28.395	4/17/98 1:45	-29.866	0.1
4/17/98 3:49	-21.516	28.445	4/17/98 1:49	-29.894	0.125
4/17/98 3:53	-19.623	28.44	4/17/98 1:53	-29.87	0.025
4/17/98 3:57	-17.712	28.33	4/17/98 1:57	-29.846	-0.19
4/17/98 4:01	-15.827	28.615	4/17/98 2:01	-29.869	-0.055
4/17/98 4:05	-13.935	28.4035	4/17/98 2:05	-29.865	0.065
4/17/98 4:09	-12.046	28.3665	4/17/98 2:09	-29.884	0.045
4/17/98 4:13	-10.104	28.134	4/17/98 2:13	-29.88	0.025
4/17/98 4:17	-8.2543	28.3215	4/17/98 2:17	-29.852	-0.095
4/17/98 4:21	-6.3727	28.19295	4/17/98 2:21	-29.875	0.11
4/17/98 4:25	-4.4772	28.4045	4/17/98 2:25	-29.875	-0.095

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4/17/98 4:29	-2.59	28.289	4/17/98 2:29	-29.871	0.005
4/17/98 4:33	-0.73411	28.50505	4/17/98 2:33	-29.853	0.135
4/17/98 4:37	1.2037	28.3175	4/17/98 2:37	-29.894	0.205
4/17/98 4:41	3.0678	28.531	4/17/98 2:41	-29.87	0.3
4/17/98 4:45	4.9669	28.4855	4/17/98 2:45	-29.826	-0.06
4/17/98 4:49	6.8672	28.449	4/17/98 2:49	-29.853	-0.18
4/17/98 4:53	8.774	28.335	4/17/98 2:53	-29.81	-0.18
4/17/98 4:57	10.664	28.355	4/17/98 2:57	-29.838	-0.085
4/17/98 5:01	12.557	28.22	4/17/98 3:01	-29.889	0.245
4/17/98 5:05	14.441	28.28	4/17/98 3:05	-29.846	-0.13
4/17/98 5:09	16.335	28.355	4/17/98 3:09	-29.855	-0.125
4/17/98 5:13	18.201	28.655	4/17/98 3:13	-29.84	0.01
4/17/98 5:17	20.097	28.56	4/17/98 3:17	-29.872	0.15
4/17/98 5:21	22.006	28.79	4/17/98 3:21	-29.88	4.505
4/17/98 5:25	23.932	28.595	4/17/98 3:25	-29.838	13.54
4/17/98 5:29	25.809	28.605	4/17/98 3:29	-29.842	22.865
4/17/98 5:33	27.764	28.31	4/17/98 3:33	-28.979	27.94
4/17/98 5:37	29.651	28.41	4/17/98 3:37	-27.13	28.185
4/17/98 5:41	31.53	28.385	4/17/98 3:41	-25.269	28.345
4/17/98 5:45	33.426	28.355	4/17/98 3:45	-23.391	28.28
4/17/98 5:49	35.333	28.305	4/17/98 3:49	-21.493	28.105
4/17/98 5:53	37.207	28.48	4/17/98 3:53	-19.6	28.1
4/17/98 5:57	39.097	28.43	4/17/98 3:57	-17.735	28.22
4/17/98 6:01	40.994	28.425	4/17/98 4:01	-15.872	28.62
4/17/98 6:05	42.903	28.325	4/17/98 4:05	-13.98	28.6285
4/17/98 6:09	44.783	28.445	4/17/98 4:09	-12.091	28.7025
4/17/98 6:13	46.679	28.32	4/17/98 4:13	-10.148	28.4645
4/17/98 6:17	48.568	28.22	4/17/98 4:17	-8.2543	28.4315
4/17/98 6:21	50.472	28.02	4/17/98 4:21	-6.3505	28.1913
4/17/98 6:25	52.343	28.055	4/17/98 4:25	-4.4551	28.403
4/17/98 6:29	54.212	26.105	4/17/98 4:29	-2.568	28.504
4/17/98 6:33	56.076	23.885	4/17/98 4:33	-0.71224	28.7197
4/17/98 6:37	57.954	16.11	4/17/98 4:37	1.2255	28.6385
4/17/98 6:41	59.433	6.2	4/17/98 4:41	3.1328	28.527
4/17/98 6:45	60.853	-1.865	4/17/98 4:45	5.0317	28.4815
4/17/98 6:49	61.176	-3.95	4/17/98 4:49	6.9532	28.334
4/17/98 6:53	60.673	-1.515	4/17/98 4:53	8.8382	28.334
4/17/98 6:57	60.48	-0.82	4/17/98 4:57	10.728	28.355
4/17/98 7:01	60.386	-0.31	4/17/98 5:01	12.62	28.43
4/17/98 7:05	60.37	-0.34	4/17/98 5:05	14.505	28.48
4/17/98 7:09	60.316	-0.13	4/17/98 5:09	16.399	28.345
4/17/98 7:13	60.324	-0.29	4/17/98 5:13	18.306	28.44
4/17/98 7:17	60.302	-0.105	4/17/98 5:17	20.201	28.45
4/17/98 7:21	60.29	0.045	4/17/98 5:21	22.068	28.79
4/17/98 7:25	60.266	0.08	4/17/98 5:25	23.994	28.9
4/17/98 7:29	60.281	-0.005	4/17/98 5:29	25.891	28.705
4/17/98 7:33	60.299	-0.04	4/17/98 5:33	27.826	28.61
4/17/98 7:37	60.282	0.005	4/17/98 5:37	29.774	28.405
4/17/98 7:41	60.28	0.145	4/17/98 5:41	31.632	28.68

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4/17/98 7:45	60.291	-0.065	4/17/98 5:45	33.548	28.65
4/17/98 7:49	60.283	0.16	4/17/98 5:49	35.455	28.595
4/17/98 7:53	60.309	0.005	4/17/98 5:53	37.368	28.375
4/17/98 7:57	60.278	0.14	4/17/98 5:57	39.278	28.32
4/17/98 8:01	60.315	0.1	4/17/98 6:01	41.174	28.415
4/17/98 8:05	60.31	0.1	4/17/98 6:05	43.043	28.515
4/17/98 8:09	60.306	0.09	4/17/98 6:09	44.942	28.635
4/17/98 8:13	60.335	-0.01	4/17/98 6:13	46.857	28.61
4/17/98 8:17	60.33	0.045	4/17/98 6:17	48.746	28.7
4/17/98 8:21	60.324	-0.035	4/17/98 6:21	50.669	28.785
4/17/98 8:25	60.333	-0.14	4/17/98 6:25	52.579	28.525
4/17/98 8:29	60.339	-0.11	4/17/98 6:29	54.486	25.99
4/17/98 8:33	60.317	0.05	4/17/98 6:33	56.426	22.81
4/17/98 8:37	60.305	-0.035	4/17/98 6:37	58.284	13.01
4/17/98 8:41	60.317	-0.065	4/17/98 6:41	59.684	2.53
4/17/98 8:45	60.327	-0.06	4/17/98 6:45	60.988	-4.86
4/17/98 8:49	60.298	0.02	4/17/98 6:49	60.886	-4.815
4/17/98 8:53	60.304	0.03	4/17/98 6:53	60.19	-1.515
4/17/98 8:57	60.315	0.1	4/17/98 6:57	60.016	-0.625
4/17/98 9:01	60.302	-0.04	4/17/98 7:01	59.923	-0.215
4/17/98 9:05	60.31	-0.06	4/17/98 7:05	59.887	-0.05
4/17/98 9:09	60.335	-0.065	4/17/98 7:09	59.891	-0.13
4/17/98 9:13	60.294	0.035	4/17/98 7:13	59.88	-0.1
4/17/98 9:17	60.298	0.04	4/17/98 7:17	59.877	-0.105
4/17/98 9:21	60.322	-0.055	4/17/98 7:21	59.865	0.045
4/17/98 9:25	60.301	0.115	4/17/98 7:25	59.86	-0.015
4/17/98 9:29	60.306	-0.075	4/17/98 7:29	59.856	-0.005
4/17/98 9:33	60.311	0.015	4/17/98 7:33	59.874	0.055
4/17/98 9:37	60.324	-0.015	4/17/98 7:37	59.857	0.1
4/17/98 9:41	60.291	0.165	4/17/98 7:41	59.855	0.05
4/17/98 9:45	60.314	0.005	4/17/98 7:45	59.885	-0.165
4/17/98 9:49	60.321	-0.05	4/17/98 7:49	59.877	-0.035
4/17/98 9:53	60.324	-0.035	4/17/98 7:53	59.865	0.1
4/17/98 9:57	60.315	0.08	4/17/98 7:57	59.852	0.05
4/17/98 10:01	60.311	0.05	4/17/98 8:01	59.87	0.005
4/17/98 10:05	60.317	0.045	4/17/98 8:05	59.885	-0.09
4/17/98 10:09	60.331	-0.015	4/17/98 8:09	59.862	0.085
4/17/98 10:13	60.321	-0.095	4/17/98 8:13	59.871	-0.105
4/17/98 10:17	60.326	0.025	4/17/98 8:17	59.867	-0.15
4/17/98 10:21	60.328	-0.025	4/17/98 8:21	59.879	-0.03
4/17/98 10:25	60.302	0.21	4/17/98 8:25	59.85	0.05
4/17/98 10:29	60.331	-0.095	4/17/98 8:29	59.837	0.08
4/17/98 10:33	60.323	-0.105	4/17/98 8:33	59.873	0.045
4/17/98 10:37	60.344	-1.3	4/17/98 8:37	59.86	0.065
4/17/98 10:41	60.312	-5.905	4/17/98 8:41	59.853	0.13
4/17/98 10:45	60.302	-12.68	4/17/98 8:45	59.882	0.04
4/17/98 10:49	60.084	-17.18	4/17/98 8:49	59.873	0.02
4/17/98 10:53	59.131	-19.845	4/17/98 8:53	59.879	0.03
4/17/98 10:57	57.766	-17.085	4/17/98 8:57	59.89	-0.095

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4/17/98 11:01	56.648	-16.685	4/17/98 9:01	59.877	-0.04
4/17/98 11:05	55.162	-15.19	4/17/98 9:05	59.885	-0.155
4/17/98 11:09	54.349	-19.415	4/17/98 9:09	59.871	0.03
4/17/98 11:13	53.311	-23.155	4/17/98 9:13	59.869	-0.06
4/17/98 11:17	52.124	-26.335	4/17/98 9:17	59.854	0.23
4/17/98 11:21	50.466	-30.09	4/17/98 9:21	59.877	0.14
4/17/98 11:25	48.68	-33.745	4/17/98 9:25	59.857	0.205
4/17/98 11:29	46.857	-35.97	4/17/98 9:29	59.9	0.025
4/17/98 11:33	44.448	-34.13	4/17/98 9:33	59.905	-0.08
4/17/98 11:37	41.931	-31.585	4/17/98 9:37	59.898	-0.01
4/17/98 11:41	39.663	-29.92	4/17/98 9:41	59.905	-0.03
4/17/98 11:45	37.622	-29.43	4/17/98 9:45	59.889	0.005
4/17/98 11:49	35.614	-29.04	4/17/98 9:49	59.896	0.05
4/17/98 11:53	33.679	-28.95	4/17/98 9:53	59.899	-0.13
4/17/98 11:57	31.736	-28.98	4/17/98 9:57	59.89	-0.02
4/17/98 12:01	29.806	-28.905	4/17/98 10:01	59.906	-0.05
4/17/98 12:05	27.889	-28.855	4/17/98 10:05	59.873	0.04
4/17/98 12:09	25.94	-28.655	4/17/98 10:09	59.886	0.08
4/17/98 12:13	24.025	-28.55	4/17/98 10:13	59.896	0.1
4/17/98 12:17	22.118	-28.54	4/17/98 10:17	59.881	0.125
4/17/98 12:21	20.209	-28.56	4/17/98 10:21	59.902	-0.02
4/17/98 12:25	18.315	-28.585	4/17/98 10:25	59.916	-0.08
4/17/98 12:29	16.41	-28.595	4/17/98 10:29	59.906	0
4/17/98 12:33	14.497	-28.6235	4/17/98 10:33	59.898	0.09
4/17/98 12:37	12.598	-28.5485	4/17/98 10:37	59.9	-1.69
4/17/98 12:41	10.691	-28.561	4/17/98 10:41	59.906	-7.655
4/17/98 12:45	8.7723	-28.5765	4/17/98 10:45	59.916	-16.385
4/17/98 12:49	6.8883	-28.698	4/17/98 10:49	59.562	-24.21
4/17/98 12:53	4.9788	-28.5353	4/17/98 10:53	58.375	-26.32
4/17/98 12:57	3.057	-28.4615	4/17/98 10:57	56.639	-24.47
4/17/98 13:01	1.1487	-28.5385	4/17/98 11:01	54.72	-21.76
4/17/98 13:05	-0.72826	-28.6562	4/17/98 11:05	53.111	-15.84
4/17/98 13:09	-2.6353	-28.9445	4/17/98 11:09	51.745	-15.95
4/17/98 13:13	-4.559	-28.635	4/17/98 11:13	50.368	-19.615
4/17/98 13:17	-6.4595	-28.6825	4/17/98 11:17	49.943	-28.93
4/17/98 13:21	-8.4242	-28.339	4/17/98 11:21	48.555	-32.4
4/17/98 13:25	-10.286	-28.465	4/17/98 11:25	46.445	-31.78
4/17/98 13:29	-12.196	-28.62	4/17/98 11:29	44.157	-30.115
4/17/98 13:33	-14.092	-28.795	4/17/98 11:33	42.075	-29.23
4/17/98 13:37	-15.979	-28.92	4/17/98 11:37	40.089	-29.065
4/17/98 13:41	-17.92	-28.71	4/17/98 11:41	38.134	-28.785
4/17/98 13:45	-19.851	-28.615	4/17/98 11:45	36.229	-28.795
4/17/98 13:49	-21.763	-19.515	4/17/98 11:49	34.276	-28.805
4/17/98 13:53	-23.662	-21.51	4/17/98 11:53	32.377	-29.025
4/17/98 13:57	-25.574	-16.41	4/17/98 11:57	30.47	-28.95
4/17/98 14:01	-25.666	-18.335	4/17/98 12:01	28.515	-28.675
4/17/98 14:05	-27.964	-7.61	4/17/98 12:05	26.572	-28.415
4/17/98 14:09	-28.856	-3.675	4/17/98 12:09	24.68	-28.735
4/17/98 14:13	-29.333	-1.585	4/17/98 12:13	22.78	-28.835

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4/17/98 14:17	-29.486	-0.88	4/17/98 12:17	20.889	-28.825
4/17/98 14:21	-29.591	-0.435	4/17/98 12:21	18.933	-28.53
4/17/98 14:25	-29.65	-0.195	4/17/98 12:25	17.013	-28.665
4/17/98 14:29	-29.662	-0.085	4/17/98 12:29	15.124	-28.675
4/17/98 14:33	-29.678	-0.13	4/17/98 12:33	13.227	-28.705
4/17/98 14:37	-29.689	-0.075	4/17/98 12:37	11.28	-28.525
4/17/98 14:41	-29.679	-0.14	4/17/98 12:41	9.389	-28.646
4/17/98 14:45	-29.704	-0.15	4/17/98 12:45	7.486	-28.442
4/17/98 14:49	-29.704	0.185	4/17/98 12:49	5.575	-28.3469
4/17/98 14:53	-29.707	0.07	4/17/98 12:53	3.6598	-28.6215
4/17/98 14:57	-29.734	0.17	4/17/98 12:57	1.7976	-28.8755
4/17/98 15:01	-29.667	-0.18	4/17/98 13:01	-0.094387	-28.8426
4/17/98 15:05	-29.693	-0.16	4/17/98 13:05	-2.0645	-28.5235
4/17/98 15:09	-29.7	-0.02	4/17/98 13:09	-3.9775	-28.701
4/17/98 15:13	-29.703	0.12	4/17/98 13:13	-5.8629	-28.1605
4/17/98 15:17	-29.725	-0.02	4/17/98 13:17	-7.7692	-28.099
4/17/98 15:21	-29.704	-0.7	4/17/98 13:21	-9.7177	-27.5265
4/17/98 15:25	-29.679	-0.33	4/17/98 13:25	-11.495	-28.21
4/17/98 15:29	-29.729	0.115	4/17/98 13:29	-13.389	-28.355
4/17/98 15:33	-29.844	1.06	4/17/98 13:33	-15.223	-28.87
4/17/98 15:37	-29.745	0.61	4/17/98 13:37	-17.137	-28.89
4/17/98 15:41	-29.706	0.385	4/17/98 13:41	-19.06	-28.91
4/17/98 15:45	-29.632	0.005	4/17/98 13:45	-20.997	-25.325
4/17/98 15:49	-29.623	0.07	4/17/98 13:49	-22.915	-19.45
4/17/98 15:53	-29.629	0.09	4/17/98 13:53	-24.842	-20.635
4/17/98 15:57	-29.631	0.115	4/17/98 13:57	-26.062	-16.665
4/17/98 16:01	-29.609	0.135	4/17/98 14:01	-26.805	-14.16
4/17/98 16:05	-29.611	0.16	4/17/98 14:05	-28.969	-3.755
4/17/98 16:09	-29.608	0.04	4/17/98 14:09	-29.395	-1.805
4/17/98 16:13	-29.582	0.06	4/17/98 14:13	-29.637	-0.885
4/17/98 16:17	-29.579	0.04	4/17/98 14:17	-29.72	-0.295
4/17/98 16:21	-29.6	0.04	4/17/98 14:21	-29.756	-0.08
4/17/98 16:25	-29.57	-0.33	4/17/98 14:25	-29.814	-0.08
4/17/98 16:29	-29.571	-0.315	4/17/98 14:29	-29.779	0.03
4/17/98 16:33	-29.592	-0.08	4/17/98 14:33	-29.772	-0.245
4/17/98 16:37	-29.636	0.295	4/17/98 14:37	-29.83	0.16
4/17/98 16:41	-29.634	0.135	4/17/98 14:41	-29.773	-0.14
4/17/98 16:45	-29.608	-0.045	4/17/98 14:45	-29.821	0.085
4/17/98 16:49	-29.577	-0.155	4/17/98 14:49	-29.798	0.19
4/17/98 16:53	-29.607	0.035	4/17/98 14:53	-29.801	0.07
4/17/98 16:57	-29.617	0.085	4/17/98 14:57	-29.804	0.05
4/17/98 17:01	-29.608	-0.075	4/17/98 15:01	-29.76	-0.185
4/17/98 17:05	-29.6	-0.085	4/17/98 15:05	-29.787	0.075
4/17/98 17:09	-29.6	-0.095	4/17/98 15:09	-29.794	-0.02
4/17/98 17:13	-29.623	0.135	4/17/98 15:13	-29.797	0.12
4/17/98 17:17	-29.617	0.07	4/17/98 15:17	-29.772	-0.84
4/17/98 17:21	-29.619	-0.035	4/17/98 15:21	-29.798	-0.35
4/17/98 17:25	-29.596	-0.26	4/17/98 15:25	-29.773	-0.09
4/17/98 17:29	-29.603	-0.13	4/17/98 15:29	-29.94	0.815

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4/17/98 17:33	-29.626	0.18	4/17/98 15:33	-29.868	0.595
4/17/98 17:37	-29.648	0.01	4/17/98 15:37	-29.791	0.255
4/17/98 17:41	-29.629	0.085	4/17/98 15:41	-29.777	0.27
4/17/98 17:45	-29.59	-0.035	4/17/98 15:45	-29.749	0.12
4/17/98 17:49	-29.646	0.11	4/17/98 15:49	-29.74	0.07
4/17/98 17:53	-29.612	0.01	4/17/98 15:53	-29.723	0.09
4/17/98 17:57	-29.597	0.035	4/17/98 15:57	-29.725	0.235
4/17/98 18:01	-29.624	0.125	4/17/98 16:01	-29.726	0.135
4/17/98 18:05	-29.61	0.13	4/17/98 16:05	-29.705	-0.19
4/17/98 18:09	-29.59	4.65	4/17/98 16:09	-29.678	-0.315
4/17/98 18:13	-29.599	13.825	4/17/98 16:13	-29.699	0.06
4/17/98 18:17	-29.584	22.865	4/17/98 16:17	-29.743	-0.08
4/17/98 18:21	-28.66	27.67	4/17/98 16:21	-29.741	0.16
4/17/98 18:25	-26.834	27.885	4/17/98 16:25	-29.687	-0.215
4/17/98 18:29	-25.011	28.22	4/17/98 16:29	-29.759	0.39
4/17/98 18:33	-23.126	28.165	4/17/98 16:33	-29.709	0.04
4/17/98 18:37	-21.257	28.395	4/17/98 16:37	-29.73	-0.29
4/17/98 18:41	-19.367	28.39	4/17/98 16:41	-29.681	-0.095
4/17/98 18:45	-17.493	28.445	4/17/98 16:45	-29.701	0.07
4/17/98 18:49	-15.578	28.2295	4/17/98 16:49	-29.788	0.43
4/17/98 18:53	-13.689	28.258	4/17/98 16:53	-29.7	0.035
4/17/98 18:57	-11.804	28.265	4/17/98 16:57	-29.687	-0.03
4/17/98 19:01	-9.9321	28.407	4/17/98 17:01	-29.702	-0.075
4/17/98 19:05	-8.0374	28.194	4/17/98 17:05	-29.693	-0.205
4/17/98 19:09	-6.151	28.31165	4/17/98 17:09	-29.693	-0.215
4/17/98 19:13	-4.2507	28.209	4/17/98 17:13	-29.717	0.015
4/17/98 19:17	-2.3986	28.4365	4/17/98 17:17	-29.734	-0.165
4/17/98 19:21	-0.48867	28.20635	4/17/98 17:21	-29.736	-0.15
4/17/98 19:25	1.3911	28.3495	4/17/98 17:25	-29.714	-0.26
4/17/98 19:29	3.2887	28.33	4/17/98 17:29	-29.767	0.105
4/17/98 19:33	5.1526	28.442	4/17/98 17:33	-29.766	-0.06
4/17/98 19:37	7.061	28.425	4/17/98 17:37	-29.766	0.135
4/17/98 19:41	8.9547	28.4115	4/17/98 17:41	-29.746	0.085
4/17/98 19:45	10.841	28.505	4/17/98 17:45	-29.778	0.205
4/17/98 19:49	12.746	28.445	4/17/98 17:49	-29.739	0.105
4/17/98 19:53	14.637	28.525	4/17/98 17:53	-29.729	-0.105
4/17/98 19:57	16.542	28.085	4/17/98 17:57	-29.737	0.03
4/17/98 20:01	18.435	23.725	4/17/98 18:01	-29.718	0.01
4/17/98 20:05	20.342	17.015	4/17/98 18:05	-29.75	1.065
4/17/98 20:09	22.159	2.545	4/17/98 18:09	-29.731	9.445
4/17/98 20:13	23.18	-5.58	4/17/98 18:13	-29.716	18.365
4/17/98 20:17	23.745	-8.6	4/17/98 18:17	-29.537	26.915
4/17/98 20:21	22.668	-3.7	4/17/98 18:21	-27.842	27.73
4/17/98 20:25	22.064	-1.265	4/17/98 18:25	-26.043	28.29
4/17/98 20:29	22.025	-1.45	4/17/98 18:29	-24.154	28.27
4/17/98 20:33	21.928	-1.325	4/17/98 18:33	-22.296	28.445
4/17/98 20:37	21.811	-1.035	4/17/98 18:37	-20.385	28.335
4/17/98 20:41	21.735	-0.825	4/17/98 18:41	-18.5	28.445
4/17/98 20:45	21.663	-0.76	4/17/98 18:45	-16.607	28.385

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4/17/98 20:49	21.604	-0.57	4/17/98 18:49	-14.718	28.394
4/17/98 20:53	21.57	-0.505	4/17/98 18:53	-12.811	28.313
4/17/98 20:57	21.511	-0.31	4/17/98 18:57	-10.93	28.431
4/17/98 21:01	21.49	-0.19	4/17/98 19:01	-9.0392	28.238
4/17/98 21:05	21.469	-0.085	4/17/98 19:05	-7.1484	28.2455
4/17/98 21:09	21.449	-0.09	4/17/98 19:09	-5.2438	28.14325
4/17/98 21:13	21.452	0	4/17/98 19:13	-3.3916	28.371
4/17/98 21:17	21.452	0	4/17/98 19:17	-1.4993	28.4865
4/17/98 21:21	21.431	0.105	4/17/98 19:21	0.38485	28.47375
4/17/98 21:25	21.452	0.105	4/17/98 19:25	2.2826	28.615
4/17/98 21:29	21.452	0.21	4/17/98 19:29	4.198	28.4865
4/17/98 21:33	21.452	0.19	4/17/98 19:33	6.0796	28.382
4/17/98 21:37	21.473	0.295	4/17/98 19:37	8.0056	28.367
4/17/98 21:41	21.494	0.275	4/17/98 19:41	9.8953	28.4585
4/17/98 21:45	21.49	0.4	4/17/98 19:45	11.756	28.555
4/17/98 21:49	21.532	0.31	4/17/98 19:49	13.679	28.495
4/17/98 21:53	21.549	0.31	4/17/98 19:53	15.587	28.575
4/17/98 21:57	21.57	0.31	4/17/98 19:57	17.467	25.435
4/17/98 22:01	21.594	0.32	4/17/98 20:01	19.378	17.14
4/17/98 22:05	21.611	0.315	4/17/98 20:05	21.302	4.22
4/17/98 22:09	21.632	0.29	4/17/98 20:09	22.554	-2.235
4/17/98 22:13	21.658	0.215	4/17/98 20:13	22.806	-3.605
4/17/98 22:17	21.674	0.22	4/17/98 20:17	22.146	0.02
4/17/98 22:21	21.69	0.335	4/17/98 20:21	22.107	-0.475
4/17/98 22:25	21.701	0.365	4/17/98 20:25	22.085	-0.955
4/17/98 22:29	21.718	0.265	4/17/98 20:29	22.15	-1.765
4/17/98 22:33	21.757	0.275	4/17/98 20:33	22.012	-1.54
4/17/98 22:37	21.774	0.2	4/17/98 20:37	21.894	-1.24
4/17/98 22:41	21.771	0.425	4/17/98 20:41	21.797	-0.925
4/17/98 22:45	21.812	0.19	4/17/98 20:45	21.704	-0.545
4/17/98 22:49	21.814	0.235	4/17/98 20:49	21.646	-0.36
4/17/98 22:53	21.856	0.105	4/17/98 20:53	21.612	-0.295
4/17/98 22:57	21.85	0.195	4/17/98 20:57	21.595	-0.11
4/17/98 23:01	21.861	0.22	4/17/98 21:01	21.574	-0.09
4/17/98 23:05	21.877	0.225	4/17/98 21:05	21.553	0.12
4/17/98 23:09	21.889	0.245	4/17/98 21:09	21.573	0.125
4/17/98 23:13	21.905	0.25	4/17/98 21:13	21.556	0.21
4/17/98 23:17	21.922	0.23	4/17/98 21:17	21.577	0.105
4/17/98 23:21	21.938	0.155	4/17/98 21:21	21.598	0.105
4/17/98 23:25	21.955	0.13	4/17/98 21:25	21.598	0.21
4/17/98 23:29	21.968	0.04	4/17/98 21:29	21.598	0.315
4/17/98 23:33	21.969	0.075	4/17/98 21:33	21.619	0.29
4/17/98 23:37	21.981	0.08	4/17/98 21:37	21.64	0.185
4/17/98 23:41	21.976	0.165	4/17/98 21:41	21.661	0.165
4/17/98 23:45	21.984	0.17	4/17/98 21:45	21.677	0.295
4/17/98 23:49	21.997	0.065	4/17/98 21:49	21.677	0.315
4/17/98 23:53	22.009	-0.035	4/17/98 21:53	21.694	0.315
4/17/98 23:57	22.018	-0.015	4/17/98 21:57	21.736	0.105
4/18/98 0:01	22.01	0.09	4/17/98 22:01	21.74	0.32

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4/18/98 0:05	22.002	0.09	4/17/98 22:05	21.757	0.31
4/18/98 0:09	22.015	0.195	4/17/98 22:09	21.757	0.29
4/18/98 0:13	22.028	-0.01	4/17/98 22:13	21.804	0.21
4/18/98 0:17	22.02	0.115	4/17/98 22:17	21.819	0.12
4/18/98 0:21	22.054	-0.01	4/17/98 22:21	21.815	0.125
4/18/98 0:25	22.026	0.09	4/17/98 22:25	21.846	0.16
4/18/98 0:29	22.043	-0.035	4/17/98 22:29	21.843	0.26
4/18/98 0:33	22.052	0.09	4/17/98 22:33	21.84	0.28
4/18/98 0:37	22.044	-0.01	4/17/98 22:37	21.878	0.2
4/18/98 0:41	22.036	-0.01	4/17/98 22:41	21.895	0.115
4/18/98 0:45	22.07	-0.22	4/17/98 22:45	21.896	0.29
4/18/98 0:49	22.042	-0.015	4/17/98 22:49	21.918	0.13
4/18/98 0:53	22.034	0.09	4/17/98 22:53	21.918	0.21
4/18/98 0:57	22.026	-0.01	4/17/98 22:57	21.954	0.09
4/18/98 1:01	22.039	-0.03	4/17/98 23:01	21.944	0.225
4/18/98 1:05	22.052	-0.135	4/17/98 23:05	21.96	0.12
4/18/98 1:09	22.024	0.07	4/17/98 23:09	21.972	0.04
4/18/98 1:13	22.033	0.01	4/17/98 23:13	21.989	0.04
4/18/98 1:17	22.025	0.01	4/17/98 23:17	21.984	0.025
4/18/98 1:21	22.038	-0.095	4/17/98 23:21	21.98	0.05
4/18/98 1:25	22.035	0.005	4/17/98 23:25	21.997	0.02
4/18/98 1:29	22.027	0.005	4/17/98 23:29	21.989	0.14
4/18/98 1:33	22.019	-0.075	4/17/98 23:33	21.99	-0.03
4/18/98 1:37	22.036	-0.075	4/17/98 23:37	22.001	0.08
4/18/98 1:41	22.028	-0.075	4/17/98 23:41	22.017	-0.04
4/18/98 1:45	22.004	0.05	4/17/98 23:45	21.984	0.065
4/18/98 1:49	22.021	-0.08	4/17/98 23:49	22.017	-0.14
4/18/98 1:53	22.013	0	4/17/98 23:53	22.009	-0.035
4/18/98 1:57	22.014	-0.025	4/17/98 23:57	21.997	0.09
4/18/98 2:01	22.005	-0.15	4/18/98 0:01	21.989	-0.01
4/18/98 2:05	22.013	-0.075	4/18/98 0:05	22.002	-0.01
4/18/98 2:09	22.009	-0.07	4/18/98 0:09	22.015	-0.115
4/18/98 2:13	21.975	0.05	4/18/98 0:13	21.987	-0.015
4/18/98 2:17	21.998	-0.11	4/18/98 0:17	22	0.005
4/18/98 2:21	21.995	-0.015	4/18/98 0:21	21.992	-0.015
4/18/98 2:25	21.985	-0.11	4/18/98 0:25	21.984	-0.01
4/18/98 2:29	21.976	0.04	4/18/98 0:29	22.001	-0.135
4/18/98 2:33	21.992	-0.19	4/18/98 0:33	21.989	-0.115
4/18/98 2:37	21.963	0.015	4/18/98 0:37	21.982	-0.015
4/18/98 2:41	21.984	-0.03	4/18/98 0:41	21.974	-0.01
4/18/98 2:45	21.954	-0.025	4/18/98 0:45	21.966	-0.01
4/18/98 2:49	21.966	-0.13	4/18/98 0:49	21.979	-0.01
4/18/98 2:53	21.978	-0.21	4/18/98 0:53	21.972	-0.12
4/18/98 2:57	21.949	0	4/18/98 0:57	21.964	-0.015
4/18/98 3:01	21.94	-0.1	4/18/98 1:01	21.977	-0.135
4/18/98 3:05	21.936	-0.015	4/18/98 1:05	21.948	0.075
4/18/98 3:09	21.949	-0.12	4/18/98 1:09	21.961	-0.03
4/18/98 3:13	21.92	0.005	4/18/98 1:13	21.95	0.005
4/18/98 3:17	21.933	-0.125	4/18/98 1:17	21.963	-0.095

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4/18/98 3:21	21.925	-0.095	4/18/98 1:21	21.955	-0.095
4/18/98 3:25	21.921	-0.11	4/18/98 1:25	21.951	-0.095
4/18/98 3:29	21.908	-0.08	4/18/98 1:29	21.944	-0.1
4/18/98 3:33	21.906	-0.19	4/18/98 1:33	21.936	-0.08
4/18/98 3:37	21.899	0.015	4/18/98 1:37	21.932	-0.075
4/18/98 3:41	21.892	-0.055	4/18/98 1:41	21.924	-0.075
4/18/98 3:45	21.868	0.18	4/18/98 1:45	21.92	0.055
4/18/98 3:49	21.902	-0.12	4/18/98 1:49	21.917	-0.08
4/18/98 3:53	21.881	-0.06	4/18/98 1:53	21.909	0
4/18/98 3:57	21.904	-0.215	4/18/98 1:57	21.931	-0.13
4/18/98 4:01	21.878	-0.04	4/18/98 2:01	21.901	0.055
4/18/98 4:05	21.869	-0.015	4/18/98 2:05	21.909	-0.075
4/18/98 4:09	21.861	-0.015	4/18/98 2:09	21.905	-0.075
4/18/98 4:13	21.87	-0.08	4/18/98 2:13	21.912	-0.05
4/18/98 4:17	21.866	-0.1	4/18/98 2:17	21.894	-0.005
4/18/98 4:21	21.858	-0.185	4/18/98 2:21	21.89	-0.01
4/18/98 4:25	21.854	-0.08	4/18/98 2:25	21.902	-0.215
4/18/98 4:29	21.846	-0.08	4/18/98 2:29	21.893	-0.17
4/18/98 4:33	21.821	0.025	4/18/98 2:33	21.888	-0.085
4/18/98 4:37	21.838	0.005	4/18/98 2:37	21.859	0.015
4/18/98 4:41	21.83	-0.095	4/18/98 2:41	21.859	-0.03
4/18/98 4:45	21.826	-0.095	4/18/98 2:45	21.871	-0.03
4/18/98 4:49	21.839	-0.095	4/18/98 2:49	21.862	-0.025
4/18/98 4:53	21.811	-0.08	4/18/98 2:53	21.853	0
4/18/98 4:57	21.807	-0.08	4/18/98 2:57	21.865	-0.1
4/18/98 5:01	21.82	-0.165	4/18/98 3:01	21.857	-0.1
4/18/98 5:05	21.795	-0.055	4/18/98 3:05	21.853	-0.12
4/18/98 5:09	21.791	-0.035	4/18/98 3:09	21.845	-0.225
4/18/98 5:13	21.787	-0.035	4/18/98 3:13	21.837	-0.1
4/18/98 5:17	21.784	-0.04	4/18/98 3:17	21.829	-0.125
4/18/98 5:21	21.784	-0.125	4/18/98 3:21	21.8	0.01
4/18/98 5:25	21.78	-0.105	4/18/98 3:25	21.817	-0.005
4/18/98 5:29	21.776	-0.085	4/18/98 3:29	21.804	-0.08
4/18/98 5:33	21.759	0	4/18/98 3:33	21.802	0.015
4/18/98 5:37	21.759	0	4/18/98 3:37	21.816	-0.09
4/18/98 5:41	21.759	0	4/18/98 3:41	21.788	0.05
4/18/98 5:45	21.759	0	4/18/98 3:45	21.805	-0.13
4/18/98 5:49	21.759	-0.005	4/18/98 3:49	21.798	-0.015
4/18/98 5:53	21.759	0.025	4/18/98 3:53	21.798	-0.165
4/18/98 5:57	21.759	-0.06	4/18/98 3:57	21.779	-0.11
4/18/98 6:01	21.758	-0.02	4/18/98 4:01	21.795	-0.25
4/18/98 6:05	21.764	-0.03	4/18/98 4:05	21.765	-0.015
4/18/98 6:09	21.747	-0.025	4/18/98 4:09	21.757	0.085
4/18/98 6:13	21.754	0.04	4/18/98 4:13	21.745	-0.08
4/18/98 6:17	21.758	0.03	4/18/98 4:17	21.762	0.005
4/18/98 6:21	21.742	0.175	4/18/98 4:21	21.774	-0.18
4/18/98 6:25	21.762	-0.02	4/18/98 4:25	21.729	0.025
4/18/98 6:29	21.764	-0.125	4/18/98 4:29	21.763	-0.08
4/18/98 6:33	21.777	-0.07	4/18/98 4:33	21.738	-0.08

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4/18/98 6:37	21.758	0.02	4/18/98 4:37	21.734	-0.1
4/18/98 6:41	21.739	0.115	4/18/98 4:41	21.747	-0.1
4/18/98 6:45	21.763	0.01	4/18/98 4:45	21.722	0.005
4/18/98 6:49	21.762	0.145	4/18/98 4:49	21.714	-0.095
4/18/98 6:53	21.762	-0.035	4/18/98 4:53	21.727	-0.075
4/18/98 6:57	21.765	0.07	4/18/98 4:57	21.723	-0.075
4/18/98 7:01	21.791	-0.15	4/18/98 5:01	21.695	-0.06
4/18/98 7:05	21.755	0.045	4/18/98 5:05	21.712	-0.165
4/18/98 7:09	21.779	0.045	4/18/98 5:09	21.708	-0.04
4/18/98 7:13	21.761	0.155	4/18/98 5:13	21.683	-0.035
4/18/98 7:17	21.764	0.07	4/18/98 5:17	21.679	-0.035
4/18/98 7:21	21.788	-0.01	4/18/98 5:21	21.7	-0.12
4/18/98 7:25	21.792	-0.015	4/18/98 5:25	21.676	0
4/18/98 7:29	21.778	0.225	4/18/98 5:29	21.672	0.02
4/18/98 7:33	21.786	6.125	4/18/98 5:33	21.676	0
4/18/98 7:37	21.789	13.48	4/18/98 5:37	21.676	0
4/18/98 7:41	21.823	12.67	4/18/98 5:41	21.676	0
4/18/98 7:45	23.011	-4.5	4/18/98 5:45	21.676	0
4/18/98 7:49	24.485	-14.35	4/18/98 5:49	21.676	-0.01
4/18/98 7:53	24.357	-14.51	4/18/98 5:53	21.676	0.13
4/18/98 7:57	22.111	-4.18	4/18/98 5:57	21.676	0.04
4/18/98 8:01	21.615	-2.18	4/18/98 6:01	21.674	-0.015
4/18/98 8:05	21.455	-1.6	4/18/98 6:05	21.702	-0.035
4/18/98 8:09	21.275	-0.785	4/18/98 6:09	21.684	0.085
4/18/98 8:13	21.179	-0.215	4/18/98 6:13	21.671	0.035
4/18/98 8:17	21.135	0.11	4/18/98 6:17	21.695	-0.07
4/18/98 8:21	21.118	0.155	4/18/98 6:21	21.701	-0.04
4/18/98 8:25	21.136	0.045	4/18/98 6:25	21.678	0.085
4/18/98 8:29	21.157	-0.085	4/18/98 6:29	21.681	0.185
4/18/98 8:33	21.149	-0.09	4/18/98 6:33	21.693	0.035
4/18/98 8:37	21.145	0.01	4/18/98 6:37	21.695	0.125
4/18/98 8:41	21.14	-0.07	4/18/98 6:41	21.718	-0.095
4/18/98 8:45	21.131	-0.02	4/18/98 6:45	21.7	0.01
4/18/98 8:49	21.147	0.205	4/18/98 6:49	21.72	-0.065
4/18/98 8:53	21.126	0.525	4/18/98 6:53	21.699	0.07
4/18/98 8:57	21.127	0.49	4/18/98 6:57	21.702	0.07
4/18/98 9:01	21.188	0.245	4/18/98 7:01	21.707	0.165
4/18/98 9:05	21.231	0.085	4/18/98 7:05	21.713	0.15
4/18/98 9:09	21.225	0.18	4/18/98 7:09	21.716	-0.055
4/18/98 9:13	21.237	0.045	4/18/98 7:13	21.74	0.05
4/18/98 9:17	21.248	0.005	4/18/98 7:17	21.743	-0.03
4/18/98 9:21	21.261	0.105	4/18/98 7:21	21.705	0.195
4/18/98 9:25	21.246	0.21	4/18/98 7:25	21.75	-0.01
4/18/98 9:29	21.249	0.115	4/18/98 7:29	21.737	0.225
4/18/98 9:33	21.282	0.14	4/18/98 7:33	21.744	6.85
4/18/98 9:37	21.288	-0.15	4/18/98 7:37	21.748	9.75
4/18/98 9:41	21.272	-0.02	4/18/98 7:41	21.782	-1.875
4/18/98 9:45	21.31	-8.15	4/18/98 7:45	23.114	-11.89
4/18/98 9:49	21.258	-15.735	4/18/98 7:49	23.698	-14.795

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4/18/98 9:53	21.268	-24.64	4/18/98 7:53	21.407	-4.135
4/18/98 9:57	19.68	-25.91	4/18/98 7:57	20.736	-0.955
4/18/98 10:01	18.111	-27.515	4/18/98 8:01	20.739	-1.14
4/18/98 10:05	16.34	-28.18	4/18/98 8:05	20.58	-0.455
4/18/98 10:09	14.498	-28.4215	4/18/98 8:09	20.545	-0.26
4/18/98 10:13	12.608	-28.6775	4/18/98 8:13	20.511	0.1
4/18/98 10:17	10.704	-24.0505	4/18/98 8:17	20.489	0.105
4/18/98 10:21	8.8137	-22.3315	4/18/98 8:21	20.493	0.15
4/18/98 10:25	6.8725	-19.4895	4/18/98 8:25	20.531	-0.06
4/18/98 10:29	5.8939	-17.7315	4/18/98 8:29	20.51	0.125
4/18/98 10:33	4.3474	-11.1795	4/18/98 8:33	20.523	0.015
4/18/98 10:37	2.9746	-4.823	4/18/98 8:37	20.519	0.115
4/18/98 10:41	2.3476	-1.8685	4/18/98 8:41	20.535	0.035
4/18/98 10:45	2.1115	-1.955	4/18/98 8:45	20.526	0.085
4/18/98 10:49	2.01	-2.327	4/18/98 8:49	20.542	-0.005
4/18/98 10:53	1.9739	-2.427	4/18/98 8:53	20.542	0.005
4/18/98 10:57	1.7205	-1.462	4/18/98 8:57	20.543	-0.03
4/18/98 11:01	1.5446	-0.539	4/18/98 9:01	20.541	-0.07
4/18/98 11:05	1.4885	-0.2565	4/18/98 9:05	20.543	0.815
4/18/98 11:09	1.4281	-0.0815	4/18/98 9:09	20.537	2.16
4/18/98 11:13	1.4368	-0.124	4/18/98 9:13	20.527	2.345
4/18/98 11:17	1.4372	-0.2135	4/18/98 9:17	20.706	1.57
4/18/98 11:21	1.4118	-0.1345	4/18/98 9:21	20.969	0.42
4/18/98 11:25	1.412	-0.094	4/18/98 9:25	20.996	0.21
4/18/98 11:29	1.3945	-0.1635	4/18/98 9:29	21.02	0.01
4/18/98 11:33	1.3849	0.014	4/18/98 9:33	21.053	0.035
4/18/98 11:37	1.3932	-0.2045	4/18/98 9:37	21.038	0.055
4/18/98 11:41	1.3618	0.3265	4/18/98 9:41	21.022	0.085
4/18/98 11:45	1.3877	5.3395	4/18/98 9:45	21.06	-1.995
4/18/98 11:49	1.3523	13.03	4/18/98 9:49	21.049	-9.24
4/18/98 11:53	1.4271	21.136	4/18/98 9:53	21.039	-17.61
4/18/98 11:57	2.4556	24.959	4/18/98 9:57	20.661	-24.795
4/18/98 12:01	3.9583	26.697	4/18/98 10:01	19.201	-26.92
4/18/98 12:05	5.6543	27.5585	4/18/98 10:05	17.517	-28.21
4/18/98 12:09	7.4474	23.138	4/18/98 10:09	15.702	-28.883
4/18/98 12:13	9.2977	14.5815	4/18/98 10:13	13.817	-29.1395
4/18/98 12:17	11.166	6.04	4/18/98 10:17	11.875	-28.9365
4/18/98 12:21	12.075	2.155	4/18/98 10:21	9.9254	-25.837
4/18/98 12:25	12.214	2.32	4/18/98 10:25	7.9891	-21.93
4/18/98 12:29	12.374	2.355	4/18/98 10:29	6.0877	-21.091
4/18/98 12:33	12.506	2.815	4/18/98 10:33	4.758	-16.386
4/18/98 12:37	12.678	2.965	4/18/98 10:37	3.6031	-11.446
4/18/98 12:41	12.845	3.44	4/18/98 10:41	1.8695	-3.1765
4/18/98 12:45	13.069	3.205	4/18/98 10:45	1.4808	-1.522
4/18/98 12:49	13.271	3.485	4/18/98 10:49	1.3139	-1.0235
4/18/98 12:53	13.533	3.27	4/18/98 10:53	1.2342	-0.6875
4/18/98 12:57	13.71	3.59	4/18/98 10:57	1.1764	-0.483
4/18/98 13:01	13.968	3.375	4/18/98 11:01	1.1092	-0.213
4/18/98 13:05	14.187	3.695	4/18/98 11:05	1.0967	0.0695

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4/18/98 13:09	14.428	3.37	4/18/98 11:09	1.0798	0.3535
4/18/98 13:13	14.643	3.495	4/18/98 11:13	1.0666	0.6385
4/18/98 13:17	14.926	3.28	4/18/98 11:17	1.1106	0.222
4/18/98 13:21	15.102	3.705	4/18/98 11:21	1.1505	0.0835
4/18/98 13:25	15.342	3.6	4/18/98 11:25	1.1943	-0.094
4/18/98 13:29	15.582	3.595	4/18/98 11:29	1.155	0.163
4/18/98 13:33	15.843	3.28	4/18/98 11:33	1.1672	0.2315
4/18/98 13:37	16.062	3.295	4/18/98 11:37	1.1755	0.122
4/18/98 13:41	16.301	8.565	4/18/98 11:41	1.1876	1.0885
4/18/98 13:45	16.499	19.545	4/18/98 11:45	1.2135	7.8385
4/18/98 13:49	16.721	28.39	4/18/98 11:49	1.1999	16.063
4/18/98 13:53	18.014	33.475	4/18/98 11:53	1.4053	23.938
4/18/98 13:57	20.408	32.715	4/18/98 11:57	2.7812	26.1205
4/18/98 14:01	22.399	33.065	4/18/98 12:01	4.4125	27.5245
4/18/98 14:05	24.709	31.375	4/18/98 12:05	6.1929	28.0555
4/18/98 14:09	26.951	29.7	4/18/98 12:09	8.0053	23.4285
4/18/98 14:13	29.012	28.87	4/18/98 12:13	9.9174	14.988
4/18/98 14:17	30.984	28.555	4/18/98 12:17	11.804	6.78
4/18/98 14:21	32.891	28.45	4/18/98 12:21	12.691	3.53
4/18/98 14:25	34.786	28.45	4/18/98 12:25	12.915	3.8
4/18/98 14:29	36.695	27.625	4/18/98 12:29	13.16	3.935
4/18/98 14:33	38.581	26.515	4/18/98 12:33	13.397	4.075
4/18/98 14:37	40.476	21.755	4/18/98 12:37	13.675	4.225
4/18/98 14:41	42.22	15.64	4/18/98 12:41	13.947	4.17
4/18/98 14:45	43.884	8.595	4/18/98 12:45	14.212	4.365
4/18/98 14:49	44.827	4.625	4/18/98 12:49	14.52	4.005
4/18/98 14:53	45.348	2.47	4/18/98 12:53	14.781	4.11
4/18/98 14:57	45.603	1.47	4/18/98 12:57	15.085	3.89
4/18/98 15:01	45.752	0.775	4/18/98 13:01	15.321	3.995
4/18/98 15:05	45.842	-2.39	4/18/98 13:05	15.603	3.785
4/18/98 15:09	45.897	-11.865	4/18/98 13:09	15.863	3.68
4/18/98 15:13	45.907	-23.345	4/18/98 13:13	16.12	3.695
4/18/98 15:17	45.364	-29.8	4/18/98 13:17	16.36	3.585
4/18/98 15:21	43.524	-29.905	4/18/98 13:21	16.599	3.585
4/18/98 15:25	41.238	-28.015	4/18/98 13:25	16.859	3.27
4/18/98 15:29	39.404	-28.43	4/18/98 13:29	17.077	3.27
4/18/98 15:33	37.543	-28.63	4/18/98 13:33	17.316	3.06
4/18/98 15:37	35.635	-28.65	4/18/98 13:37	17.513	3.075
4/18/98 15:41	33.718	-23	4/18/98 13:41	17.731	6.55
4/18/98 15:45	31.817	-21.67	4/18/98 13:45	17.928	17.09
4/18/98 15:49	29.905	-16.085	4/18/98 13:49	18.128	24.68
4/18/98 15:53	29.118	-17.52	4/18/98 13:53	19.041	29.99
4/18/98 15:57	27.483	-9.745	4/18/98 13:57	21.346	28.95
4/18/98 16:01	26.688	-6.02	4/18/98 14:01	23.064	30.15
4/18/98 16:05	25.614	-0.915	4/18/98 14:05	25.039	29.825
4/18/98 16:09	25.534	-0.905	4/18/98 14:09	27.136	28.875
4/18/98 16:13	25.484	-0.83	4/18/98 14:13	29.094	28.565
4/18/98 16:17	25.431	-0.865	4/18/98 14:17	31.004	28.355
4/18/98 16:21	25.353	-0.59	4/18/98 14:21	32.911	28.35

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4/18/98 16:25	25.318	-0.605	4/18/98 14:25	34.807	28.345
4/18/98 16:29	25.258	-0.44	4/18/98 14:29	36.675	27.425
4/18/98 16:33	25.235	-0.325	4/18/98 14:33	38.581	25.52
4/18/98 16:37	25.197	-0.2	4/18/98 14:37	40.476	19.47
4/18/98 16:38	25.17	-0.1	4/18/98 14:41	42.16	12.86
			4/18/98 14:45	43.685	5.915
			4/18/98 14:49	44.37	2.74
			4/18/98 14:53	44.732	1.08
			4/18/98 14:57	44.868	0.58
			4/18/98 15:01	44.918	0.175
			4/18/98 15:05	44.948	-0.005
			4/18/98 15:09	44.984	0.065
			4/18/98 15:13	44.953	0.075
			4/18/98 15:17	44.947	0.255
			4/18/98 15:21	44.997	0.06
			4/18/98 15:25	44.968	0.16
			4/18/98 15:29	44.998	-0.045
			4/18/98 15:33	45.009	0.065
			4/18/98 15:37	45	0.05
			4/18/98 15:41	44.989	-1.13
			4/18/98 15:45	45.022	-10.815
			4/18/98 15:49	45.01	-20.515
			4/18/98 15:53	44.763	-28.715
			4/18/98 15:57	42.859	-28.65
			4/18/98 16:01	40.907	-28.54
			4/18/98 16:05	39.02	-28.6
			4/18/98 16:09	37.129	-26.04
			4/18/98 16:13	35.199	-19.42
			4/18/98 16:17	33.3	-14.615
			4/18/98 16:21	31.921	-19.315
			4/18/98 16:25	31.315	-28.935
			4/18/98 16:29	30.377	-25.205
			4/18/98 16:33	28.058	-13.61
			4/18/98 16:37	25.528	-6
			4/18/98 16:38	25.336	-1

Section 4A EMI/RE02 Testing

“NOT REQUIRED”

This test was not performed for PLO F03. Qualification set by F01 testing.

Section 4B EMI/RE02 Testing

“NOT REQUIRED”

This test was not performed for PLO F04. Qualification set by F01 testing.

Section 5A: Frequency and Power Hysteresis - F03

This section contains the results of a full functional test over temperature taken after the PLO (F03) was subjected to thermal cycling under vacuum and vibration.

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6BC

TEST DATA SHEET (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Test Setup Verified: STBY Post-Thermal Cycling CPT

Signature _____

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.05V	PASS
	Spectrum Analyzer	< 1.0 Vac	.05V	PASS
	Frequency Counter Chassis	< 1.0 Vac	.04V	PASS
	Power Meter Chassis	< 1.0 Vac	.05V	PASS
4	Evacuate vacuum chamber and record pressure	< 10^{-2} torr	Pressure = _____ torr	* Ambient
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 21.8 °C	Pass
			TC2 = 21.9 °C	N/A
			TC3 = 21.9 °C	N/A
6	DRO L/A	< 1V 0 to 1 V	DRO L/A = 57 mV	Pass
	PLO L/A	< 1V 0 to 1 V	PLO L/A = 57 mV	Pass
	Is PLO locked?	Yes	Yes <u>X</u> No _____	Pass
7	PLO Frequency	57.290344 GHz ± 200 kHz	Freq. = 57.29033499 GHz	Pass
	PLO Power	17 to 20 dBm	P = 18.86 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 \pm 0.1 V	VM1 = 15.03 V	Pass
	VM2 Voltage	-15 \pm 0.1 V	VM2 = -15.09 V	Pass
	IM1 Current	600 mA max.	IM1 = 521 mA	Pass
	IM2 Current	100 mA max.	IM2 = 66.6 mA	Pass
	DRO L/A Voltage	< 1V 0 to 1 V	DRO L/A = 56 mV	Pass
12	PLO L/A Voltage	< 1V 0 to 1 V	PLO L/A = 54 mV	Pass
	RF Output Power and Frequency	17 to 20 dBm	P = 18.86 dBm	Pass
	Baseplate Temp. (TC1)	57.290344 GHz ± 200 kHz	Freq. = 57.290335021 GHz	Pass
13	Frequency vs. Voltage	TC1 = 22 ± 2 °C	TC1 = 22.1 °C	Pass
		± 15 V Supplies	+Voltage = 15.23 V	Pass
			-Voltage = -15.20 V	Pass
		57.290344 GHz ± 200 kHz	Freq. = 57.29033625 GHz	Pass
		17 to 20 dBm	P = 18.46 dBm	Pass

* Record data only if performing test under vacuum

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TEST DATA SHEET 8 (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.83</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.81</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29033619</u> GHz	Pass
		17 to 20 dBm	P = <u>18.84</u> dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See plots	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = <u>-74</u> dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>1 Hz</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>33</u> dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ± 2°C	TC1 = <u>1.10°C</u>	Pass
			TC2 = <u>1.60°C</u>	N/A
			TC3 = <u>0.90°C</u>	N/A
		0 - 1V	DRO L/A = <u>48</u> mV	Pass
		0 - 1V	PLO L/A = <u>48</u> mV	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>+15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>507</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>64.6</u> mA	Pass
	DRO L/A Voltage	<u><1V 0 to 1</u>	DRO L/A = <u>48</u> mV	Pass
	PLO L/A Voltage	<u><1V 0 to 1</u>	PLO L/A = <u>48</u> mV	Pass
	RF Output Power	17 to 20 dBm	Power = <u>18.51</u> dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.2903347</u> GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>+15.2</u> V	Pass
		-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.2903346</u> GHz	Pass
		17 to 20 dBm	Power = <u>18.51</u> dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.8</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.8</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.2903347</u> GHz	Pass
		17 to 20 dBm	Power = <u>18.51</u> dBm	

6BC
TEST DATA SHEET (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	<i>See Plots</i>	
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = <u>-77</u> dBm	<i>Pass</i>
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>10 Hz</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>.29</u> dB Peak	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ± 2°C	TC1 = <u>43.9°C</u>	<i>Pass</i>
			TC2 = <u>44.5°C</u>	N/A
			TC3 = <u>44.1°C</u>	N/A
		0 - 1V	DRO L/A = <u>.101</u> V	<i>Pass</i>
		0 - 1V	PLO L/A = <u>.093</u> V	<i>Pass</i>
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>15.0</u> V	<i>Pass</i>
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	<i>Pass</i>
	IM1 Current	600 mA max.	IM1 = <u>532</u> mA	<i>Pass</i>
	IM2 Current	100 mA max.	IM2 = <u>68</u> mA	<i>Pass</i>
	DRO L/A Voltage	+15.0 ± 0.1 V	DRO L/A = <u>.101</u> V	<i>Pass</i>
	PLO L/A Voltage	+15.0 ± 0.1 V	PLO L/A = <u>.093</u> V	<i>Pass</i>
	RF Output Power and	17 to 20 dBm	Power = <u>18.15</u> dBm	
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.29032660</u> GHz	<i>Pass</i>
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.2</u> V	<i>Pass</i>
		-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	<i>Pass</i>
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29032660</u> GHz	
		17 to 20 dBm	Power = <u>18.13</u> dBm	
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.8</u> V	<i>Pass</i>
		-14.8 ± 0.05 V	-Voltage = <u>-14.8</u> V	<i>Pass</i>
		57.290344 GHz ± 200 kHz	Freq. = <u>57.29032660</u> GHz	<i>Pass</i>
		17 to 20 dBm	Power = <u>18.14</u> dBm	<i>Pass</i>

SHEET 23 OF 34
 RCP NO. 1675

AE-26758A
 21 Jan 98

60C
TEST DATA SHEET (Sheet 4 of 4)
 Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Spurious and Sub	-200 to -90 dBc	<i>See plots</i>	Pass
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = -77 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .42 dB Peak	N/A

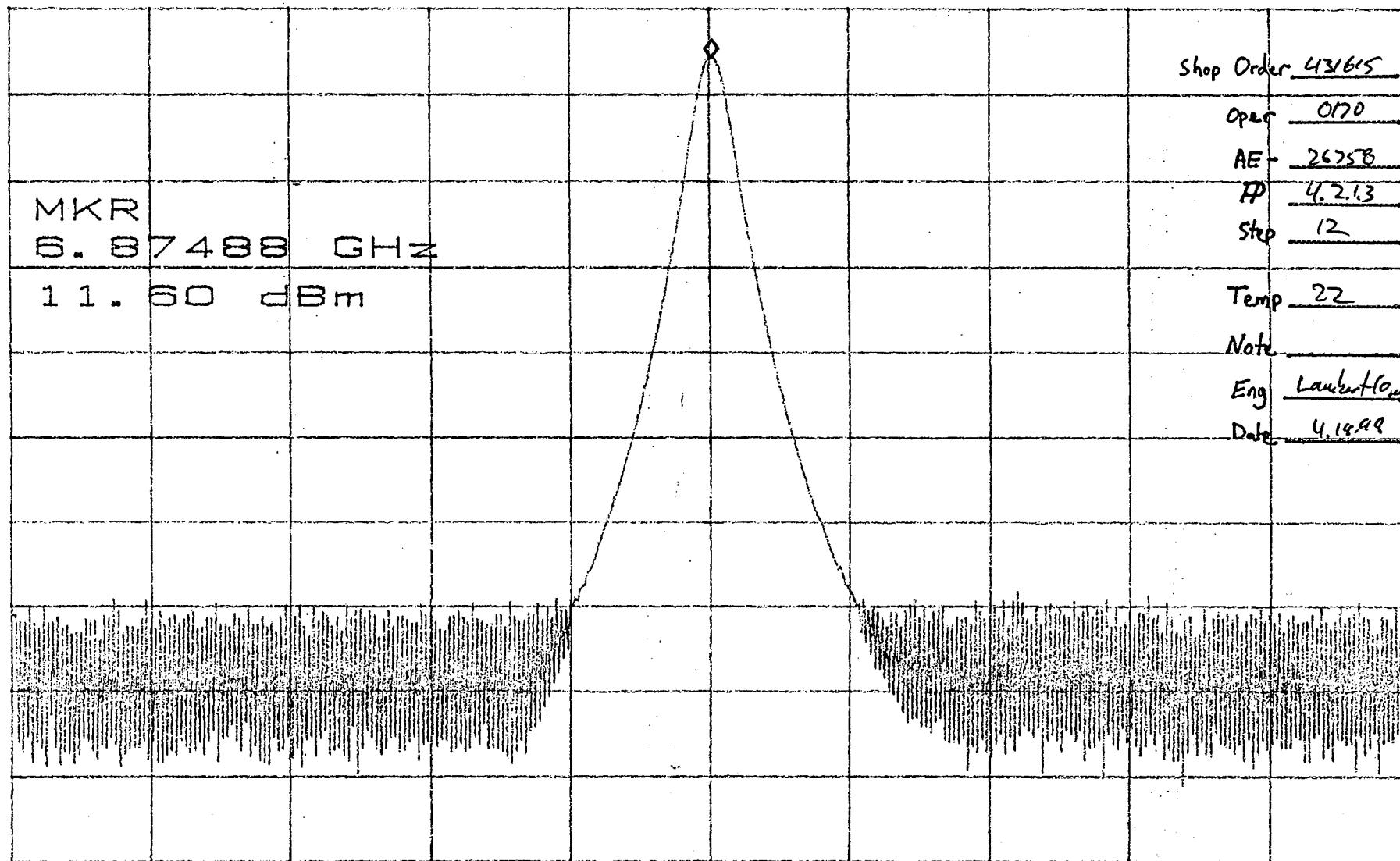
Shop Order No.: 431615
 Operation: α70
 Unit Serial No.: F03
 Date: 4.18.98

Test Engineer: M. Ehlil
 Quality Assurance: Control (24 APR 20 98)
 Govt. Rep. () 4/20/98
 DCMC:

ATTEN 30dB
RL 17.1dBm

10dB/

MKR 11.60dBm
6.87488GHz



CENTER 6.87485GHz
*RBW 300kHz *VBW 300kHz

SPAN 20.00MHz
SWP 50.0ms

APR 20 98 (74/190)

L 30.0dB

RL 0dBm

MKR 0dBm

57.29033GHz

10dB/100

Shop Order 431615

Oper 0150

AE 26258

TP 4.2.1.3

Step 12

Temp 22%

Note

Eng Chen

Date 4.14.98

MKR

57.29033 GHz

0 dBm

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

*VBW 300kHz

SWP 50.0ms

MKR -94.00dBm
57.720013725GHz

D

APR 20 98

CL 30.0dB

VAVG 28

MKR -94.17dBm

RL 0dBm

10dB/

57.576878884GHz

D

MKR

57.576878884 GHz

-94.17 dBm

Shop Order 431615Oper D170AE 26258TP 4.2.13Step 15Temp 22°C

Note _____

Eng Bobell/LandDate 11.18.98

CENTER 57.576878901GHz

SPAN 1.000kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 67.0ms

APR 20 98 (74)
(190)

RL 0dBm

10dB/

57. 433562044GHz

D

MKR				
57.433562044	GHz			
193.67	dBm			

Shop Order 431615

Opert 0170

AE- 26758

4.2.1.3

Step 15

Temp 22°C

Note

Eng Späth / Kuntz

Date 4.14.98

SPAN 1.000kHz

SWP 67.0ms



MKR -93.83dBm
57.1471020GHz

57.	1 47 1	020	GHZ
100.	000	000	

Date 4.18.98

CENTER 57.1471104GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 3.0kHz SWP 140ms

100 20 98 7A 190

MKR -94.50dBm
57.0041345GHz

MKR			
57.	0041	345	GHZ
194.	50	0000	

Date 4.14.98

SWP 140ms

RL ODBM

10dB/

56.7174261 GHz

D

MKR			
56.	7174261		GHz

103.33 485

Shop Order 4131615

Open 0170

AE - 26758

4.2.1.3

Step 15Temp 22°C

Note

Eng M. Ghah / Gary L

Date 11.14.98

CENTER 56.7174328GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 140ms

APR 20 98

CL 30.0dB

RL 0dBm

VAVG 50

10dB/

MKR -93.50dBm

56. 8606520GHz

MKR

56. 8606520 GHz

- 93.50 dBm

Shop Order 431615

per 0170

AE- 26758

4.2.1.3

Step 15Temp 22°C

Note _____

Eng m. Opdahl, Lambert

Date 4.18.98

CENTER 56.8606587GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 140ms

7A
190

APR 20 98

RL 0dBm

114. 58067275GHz

104B/

Shop Order 431615

oper 0170

AE- 26759

P 4.2.1.3

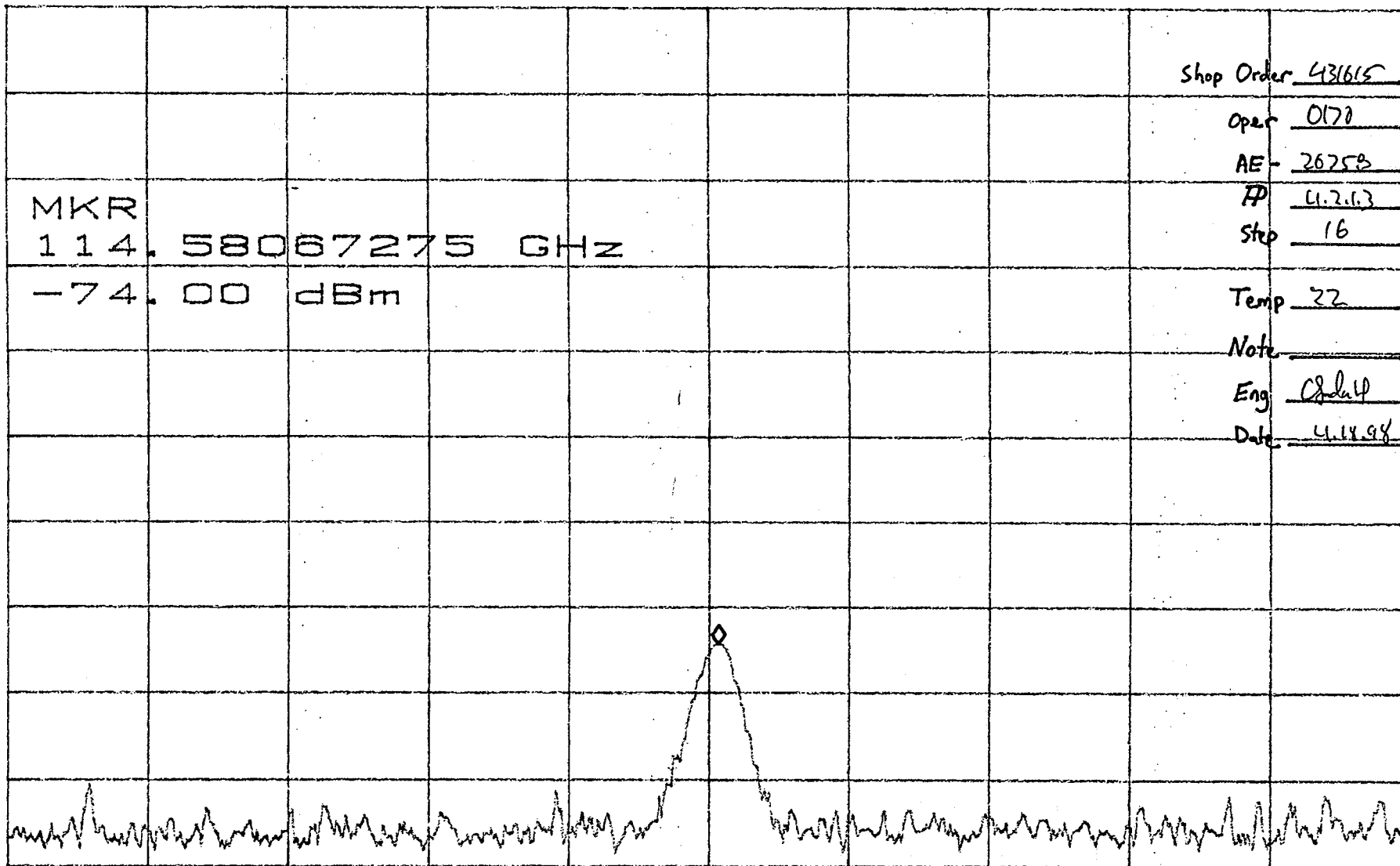
Step 16

Temp 22

Note

Eng. Chauhan

Date 4.18.98



SPAN 50.00KHz

*VBW 1.0KHz

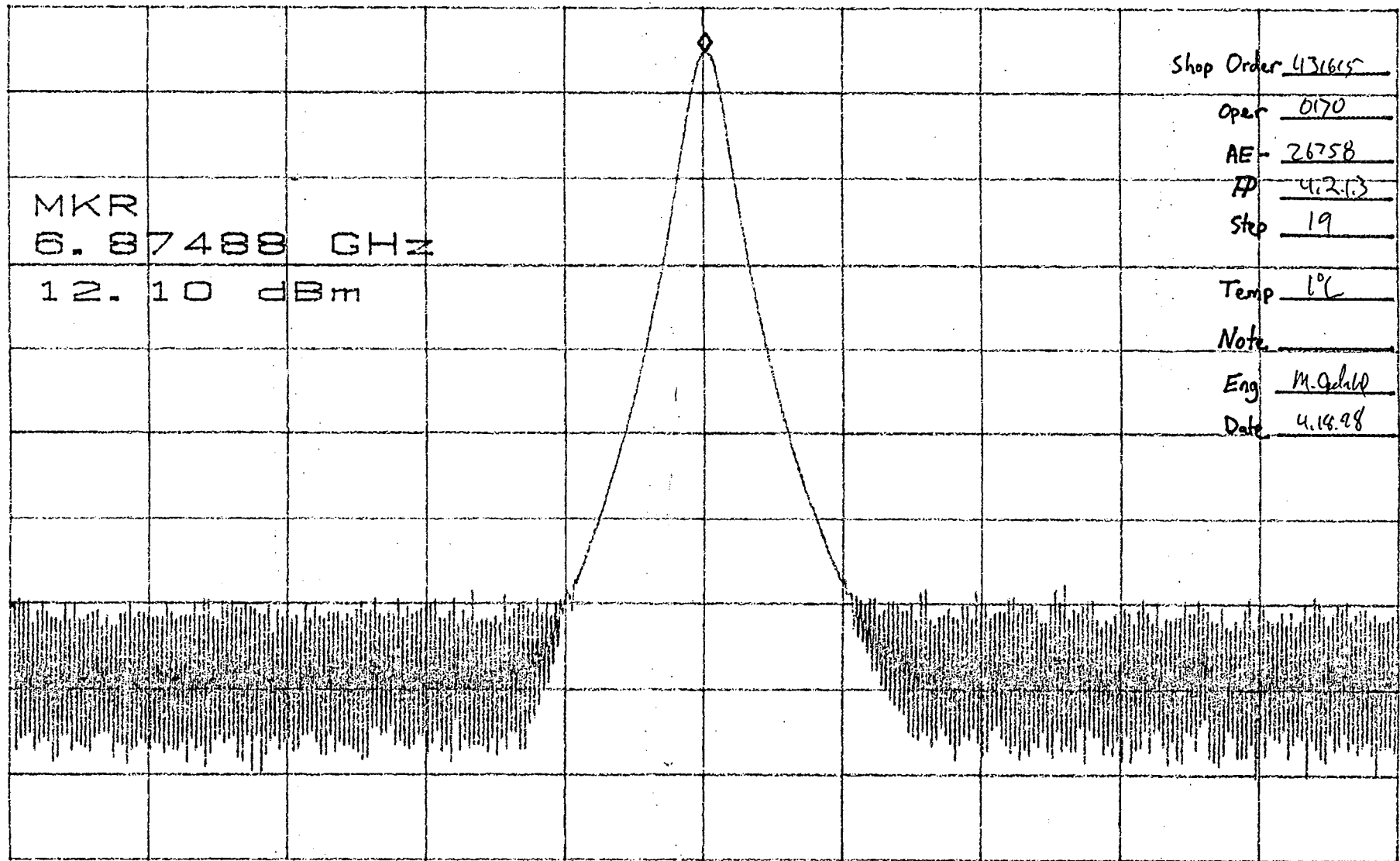
SWP 200ms

HZ (061 190 7A)
APR 20 98

ATTN 30dB
RL 17.1dBm

10dB/

MKR 12.10dBm
6.87488GHz



Shop Order 431615

Oper 0170

AE 26758

AP 4.2.13

Step 19

Temp 1°C

Note _____

Eng M. G. Hall

Date 4.18.98

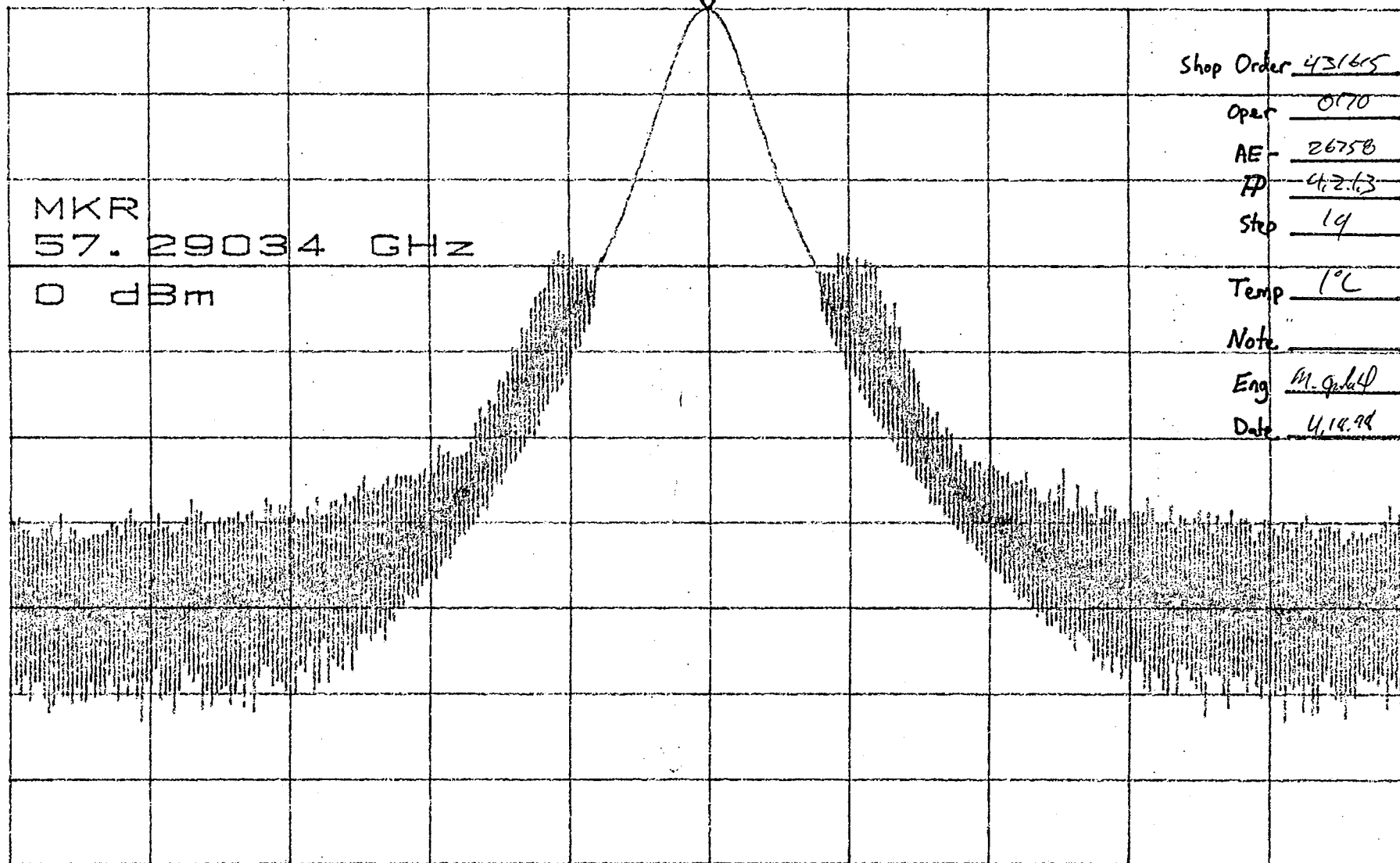
MKR
6.87488 GHz
12.10 dBm

CENTER 6.87485GHz SPAN 20.00MHz
*RBW 300kHz *VBW 300kHz (7A 190) SWP 50.0ms
APR 20 98

L 30.0dB
RL 0dBm

MKR 0dBm
57.29034GHz

10dB/



Shop Order 43165

Oper 0170

AE 26758

FP 4.2.13

Step 19

Temp 1°C

Note

Eng M. Gubel

Date 4.14.98

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

*VBW 300kHz

SWP 50.0ms

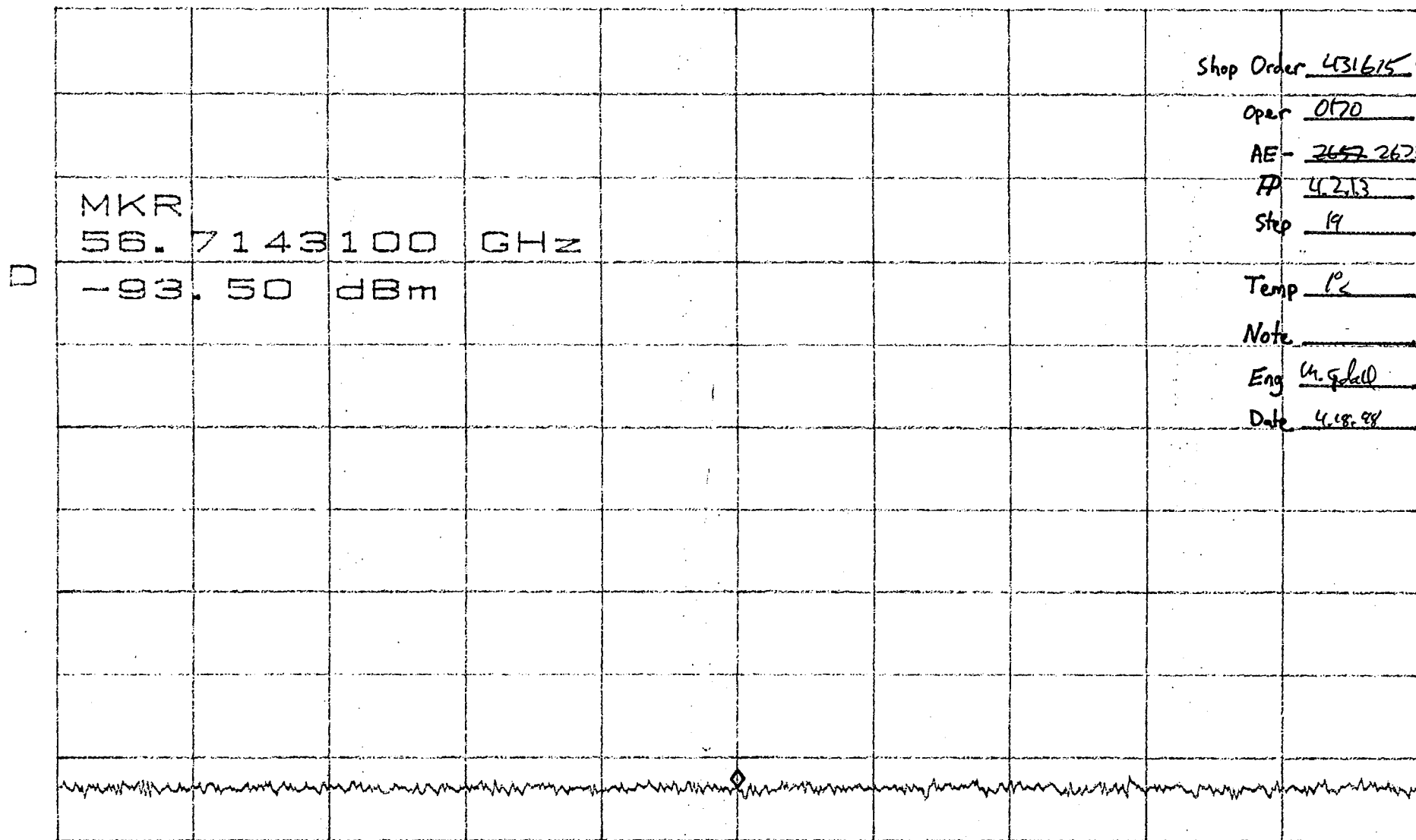
APR 20 98

7A
190

CL 30.0dB
RL 0dBm

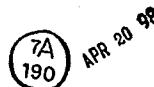
VAVG 100
10dB/

MKR -93.50dBm
56.7143100GHz



CENTER 56.7143100GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms



CL 30.0dB
RL 0dBm

VAVG 40
10dB/

MKR -93.00dBm
56.8606560GHz

D

MKR
56.8606560 GHz
-93.00 dBm

Shop Order 43165

Oper 070

AE 26758

TP 4.213

Step 19

Temp 1'

Note _____

Eng Ch. G. Hall

Date 4.14.98

CENTER 56.8606560GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 3.0kHz SWP 140ms

APR 20 98



CL 30.0dB

VAVG 25

MKR -93.33dBm

RL 0dBm

10dB/

56.0038820GHz

Shop Order 431615

Oper 0170

AE 26758

FD 4.21.3

Step 19

Temp 1°C

Note

Eng Mark G. L.

Date 4.18.98

MKR
56.0038820 GHz

-93.33 dBm

CENTER 56.0038820GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms



APR 20 98

MKR -93.00dBm
57.1471080GHz

57.1471	000	GIN
100.00	000	

Date 4.18.28

APR 20 98. 7A 190

CL 30.0dB

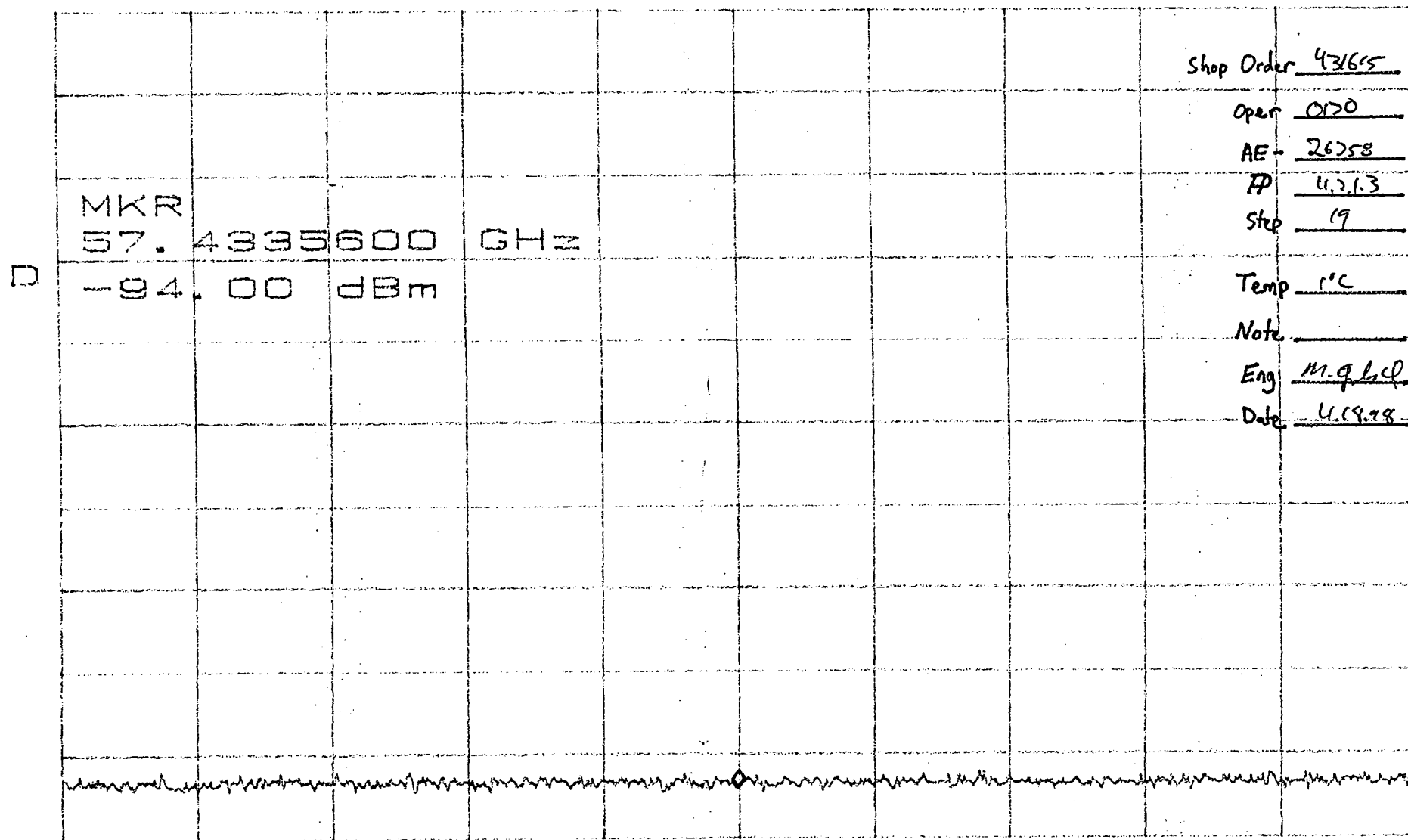
VAVG 49

MKR -94.00dBm

RL 0dBm

10dB/

57.4335600GHz



CENTER 57.4335600GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 140ms

7A
190

APR 20 98

CL 30.0dB
RL 0dBm

VAVG 36
10dB/

MKR -93.33dBm
57.5767860GHz

D

MKR
57.5767860 GHz
-93.33 dBm

Shop Order 43165

Oper 070

AE 2658

TP (1.2.1.3)

Step 19

Temp 1°C

Note _____

Eng M. G. Lal

Date 4.18.98

CENTER 57.5767860GHz

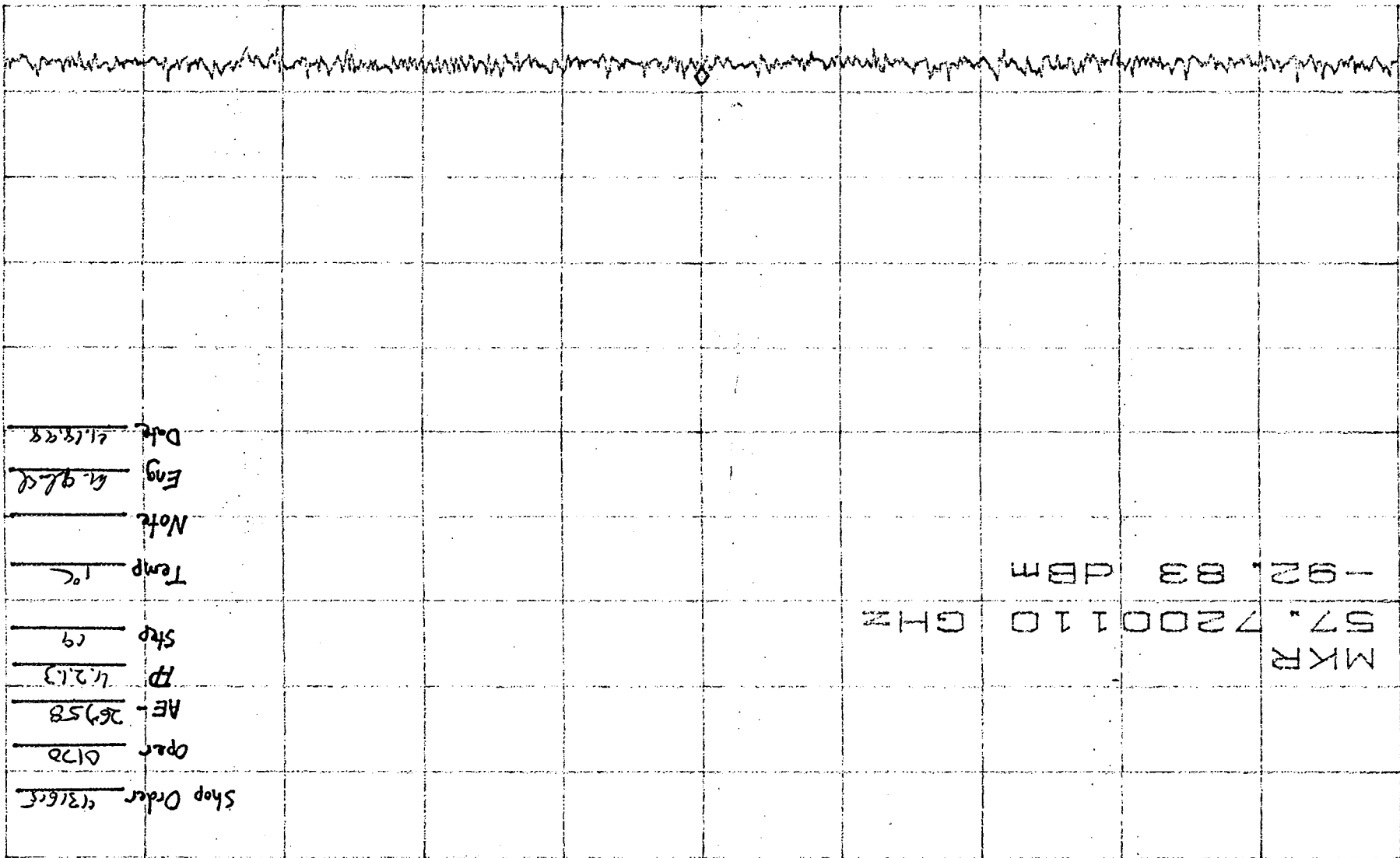
SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

CL 30.0dB VAVG 11 MKR -92.83dBM 57.7200110GHz



Shop Order 431655
 Oper 0120
 AE - 26758
 RP 42.13
 Stp 19
 Temp 1°C
 Note
 Eng 4.92.4
 Date 4.18.98

CENTER 57.7200110GHz SPAN 500.0KHZ
 *RBW 3.0KHZ *VBW 3.0KHZ
 7A 190
 APR 20 98
 SVP 140ms

CL 30.0dB
RL 0dBm

VAVG 52
10dB/

MKR -92.50dBm
57.8632370GHz

D MKR
57.8632370 GHz
-92.50 dBm

Shop Order 93765

Oper 0170

AE 26758

IP 4.2.1.7

Step 19

Temp 1°C

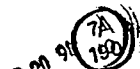
Note _____

Eng M. G. L. Q

Date 4.18.98

CENTER 57.8632370GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms



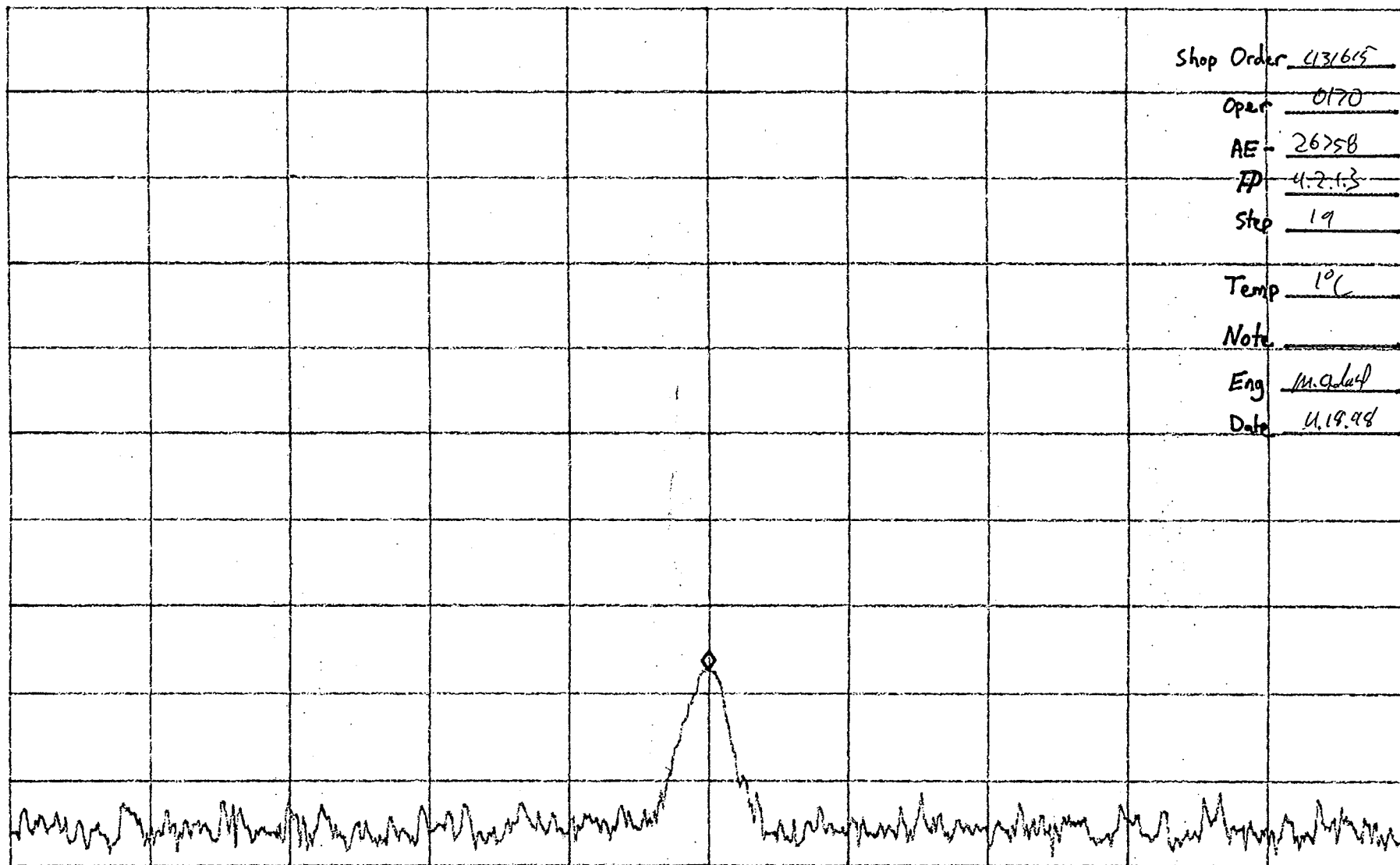
L 30.0dB

RL 0dBm

10dB/

MKR -77.17dBm

114.58067350GHz



CENTER 114.58067350GHz

SPAN 50.00KHz

*RBW 1.0KHz

*VBW 1.0KHz

SWP 200ms

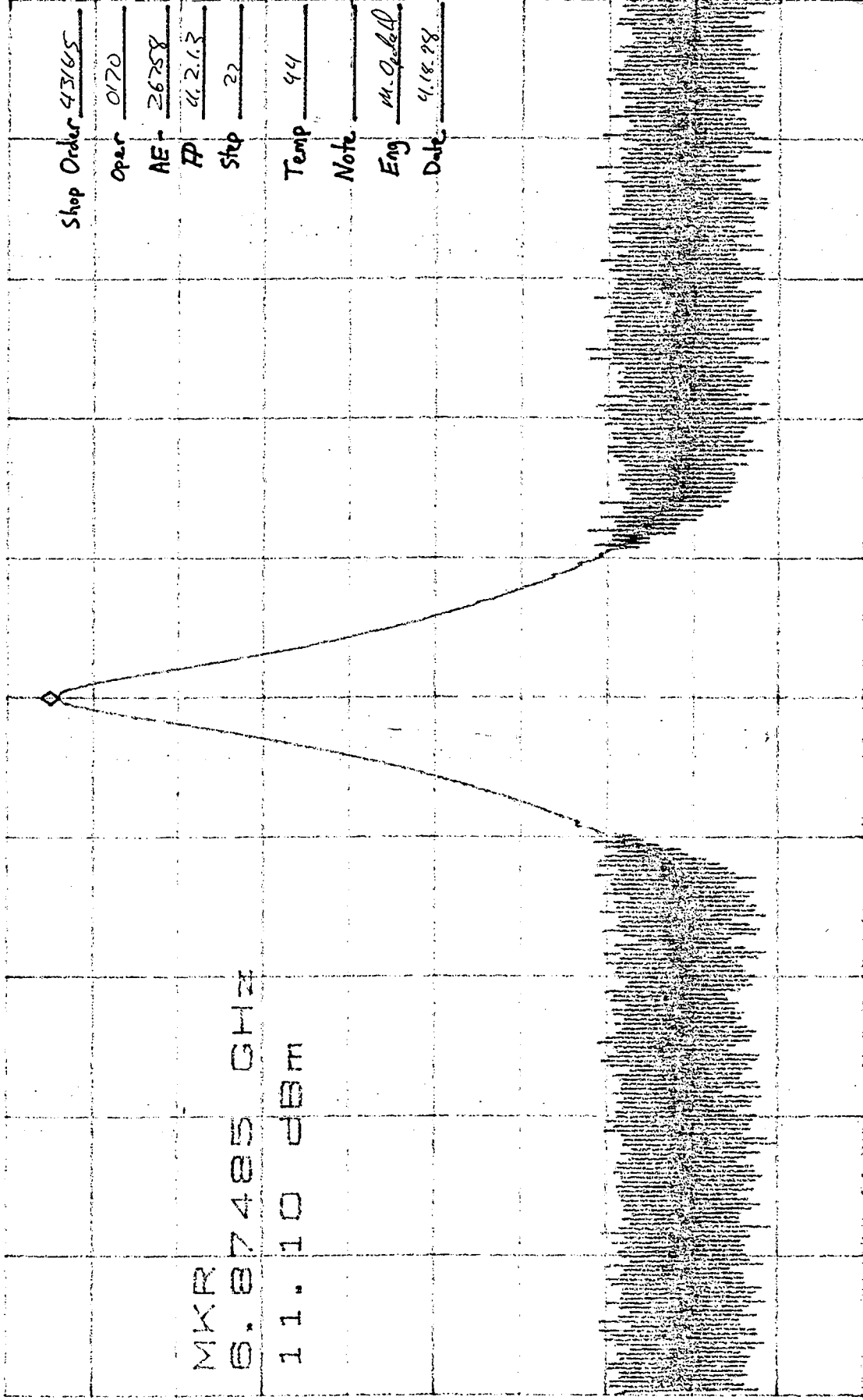
74
190
APR 20 98

ATTEN 30dB
REL 7.10dB

MKR 11.10dBm
6.87485GHz

10dB/

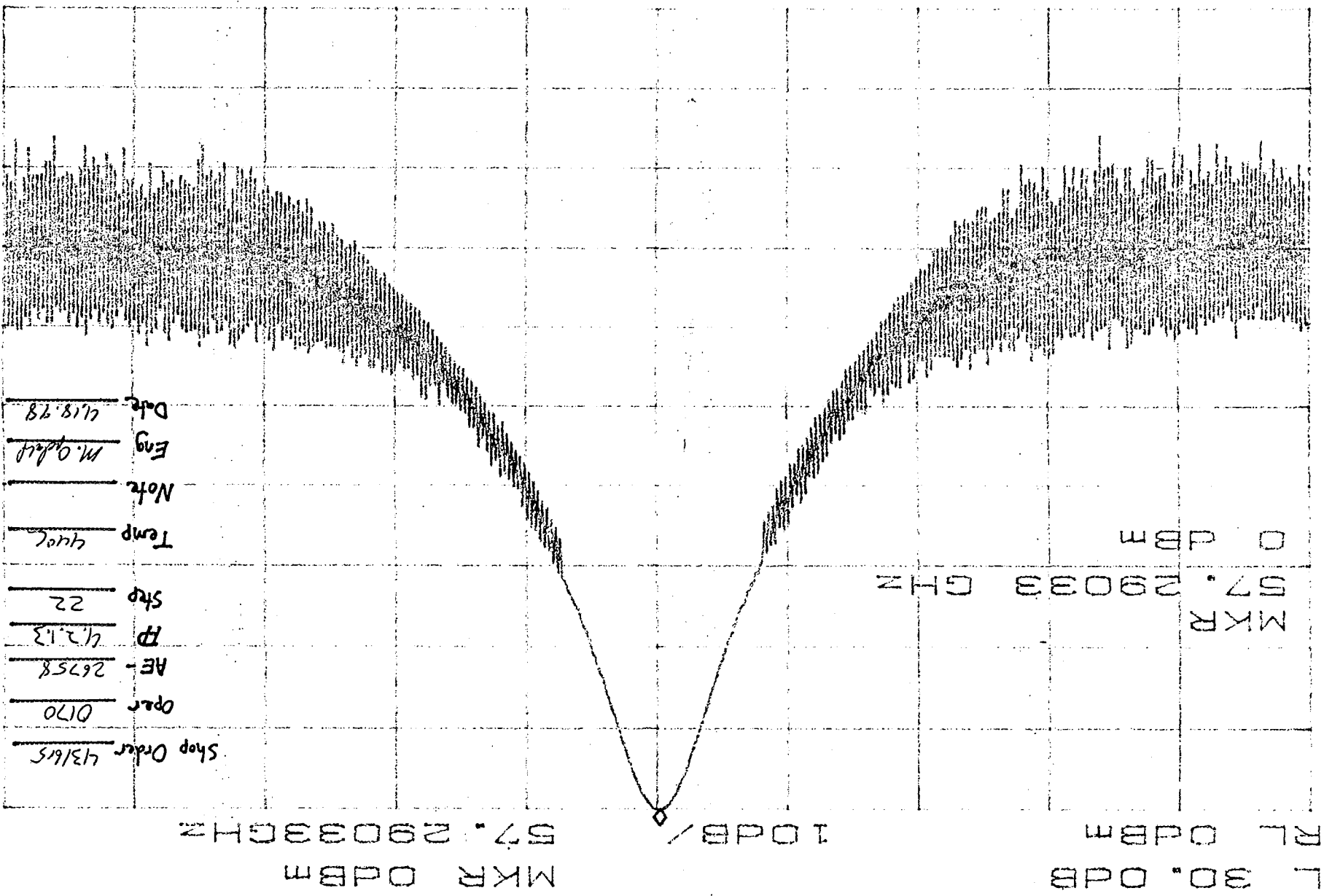
MK 07400 GHz
11.10 dB



CENTRE 6.87485GHz
* VSW 300KHz

SPAN 20.00MHz
SWP 50.0dB

APR 20 1998
7A 190



Shop Order 43165
 Oper 0170
 AE 26758
 TP 42.13
 Stp 22
 Temp 440C
 Note
 Eng M. G. J. J.
 Date 4/18/78

CENTER 57.29034GHZ
 SPAN 10.00MHZ
 *RBW 300KHZ *VBW 300KHZ
 SWP 50.0MS

APR 20 1978

RL 0dBm

10dB/

56. 7174206GHz

MKR			
56.	7 1 7 4	206	GHz
-93.	17	483	

Shop Order 431615

Oper CY70

AE- 26758

P 421.3

Step 22Temp 44°C

Note _____

Eng M. Opelaar

Date 4.18.98

D

CENTER 56.7174281GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 1.40ms

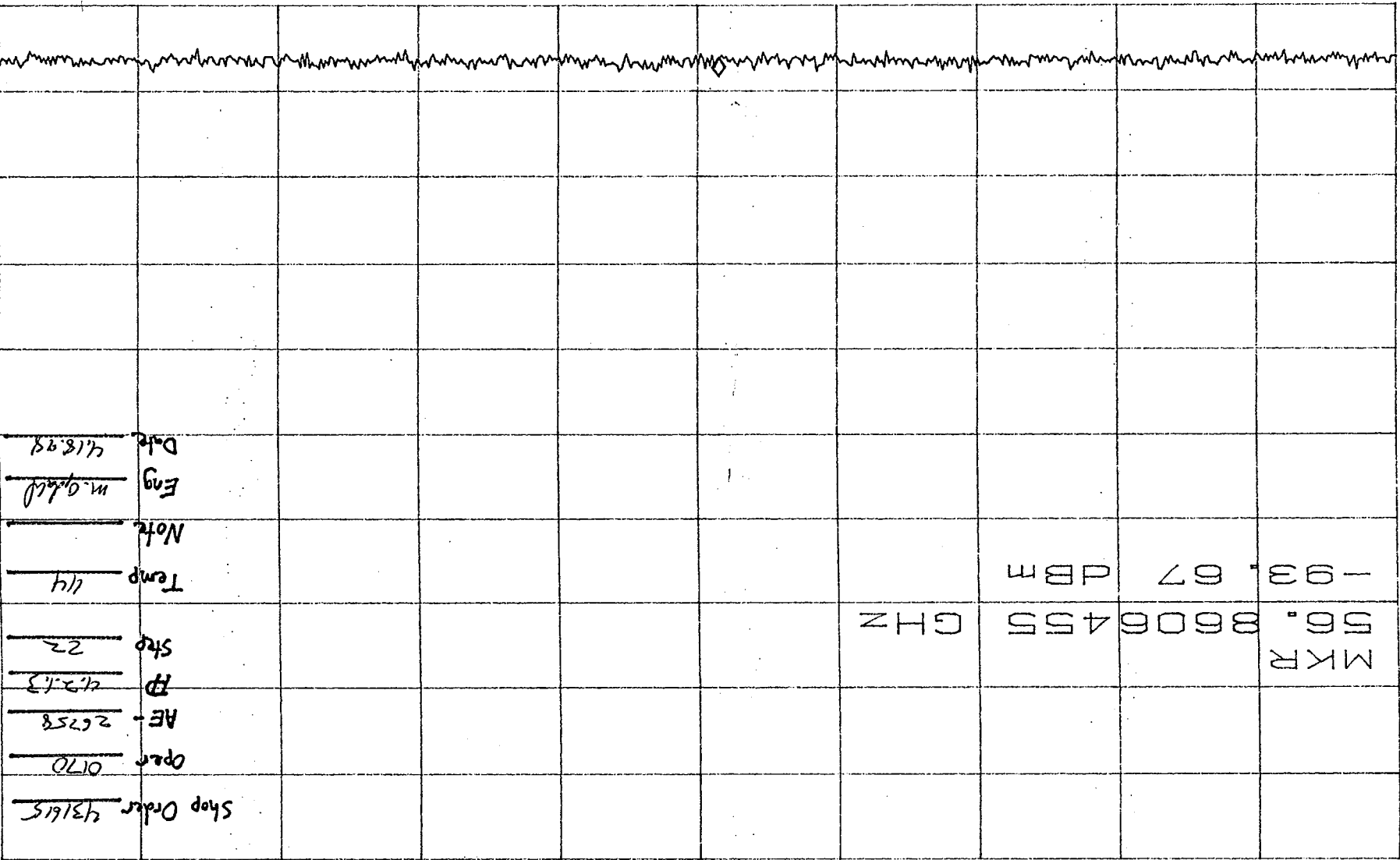
APR 20 1968

CL 30.0dB VAVG 37 MKR -93.67dBm 56.8606455GHz

RL 0dBm

10dB/

56.8606455GHz



Shop Order 431615
 Oper 0170
 AE 26758
 TP 472.13
 Stop 22
 Temp 44
 Note
 Eng m. g. d. d.
 Date 4/18/98

CENTER 56.8606530GHz SPAN 500.0KHz
 *RBW 3.0KHz *VBW 3.0KHz SVP 140ms

APR 20 98

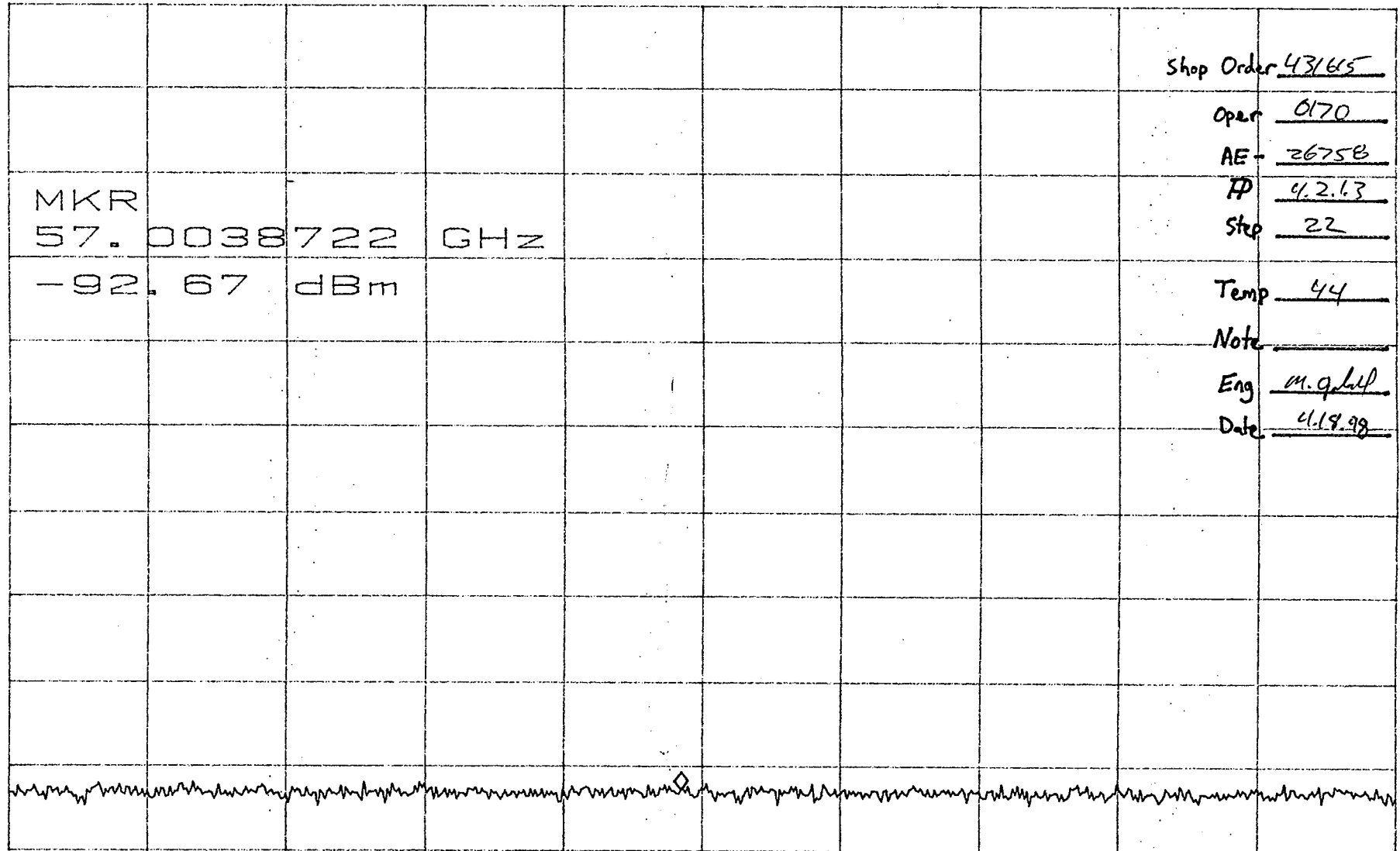
190

CL 30.0dB
RL 0dBm

VAVG 23
10dB/

MKR -92.67dBm
57.0038722GHz

D



CENTER 57.0038797GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 3.0kHz SWP 140ms

CL 30.0dB

VAVG 12

MKR -94.33dBm

RL 0dBm

10dB/

57.1470975GHz

D

MKR

57.1470975 GHz

-94.33 dBm

Shop Order 431615

Oper 0170

AE 26758

AP 4.213

Step 22

Temp 44

Note _____

Eng m g h d

Date 11.08.98

CENTER 57.1471050GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

7A
190

APR 20 98

VAVG 11
10dB/

MKR -93.83dBm
57.4335389GHz

D

MKR			
57.4335	572	GHZ	
192.83	DBE		

Shop Order 431615

0928 0120

AE- 26758

P 9213

Step 22

Temp 44

Note _____

Eng M. Oppland

Date 4.18.98

CENTER 57.4335572GHz

SPAN 500.0KHz

*RBW 3.0kHz

*VBW 3.0KHz

SWP 140ms

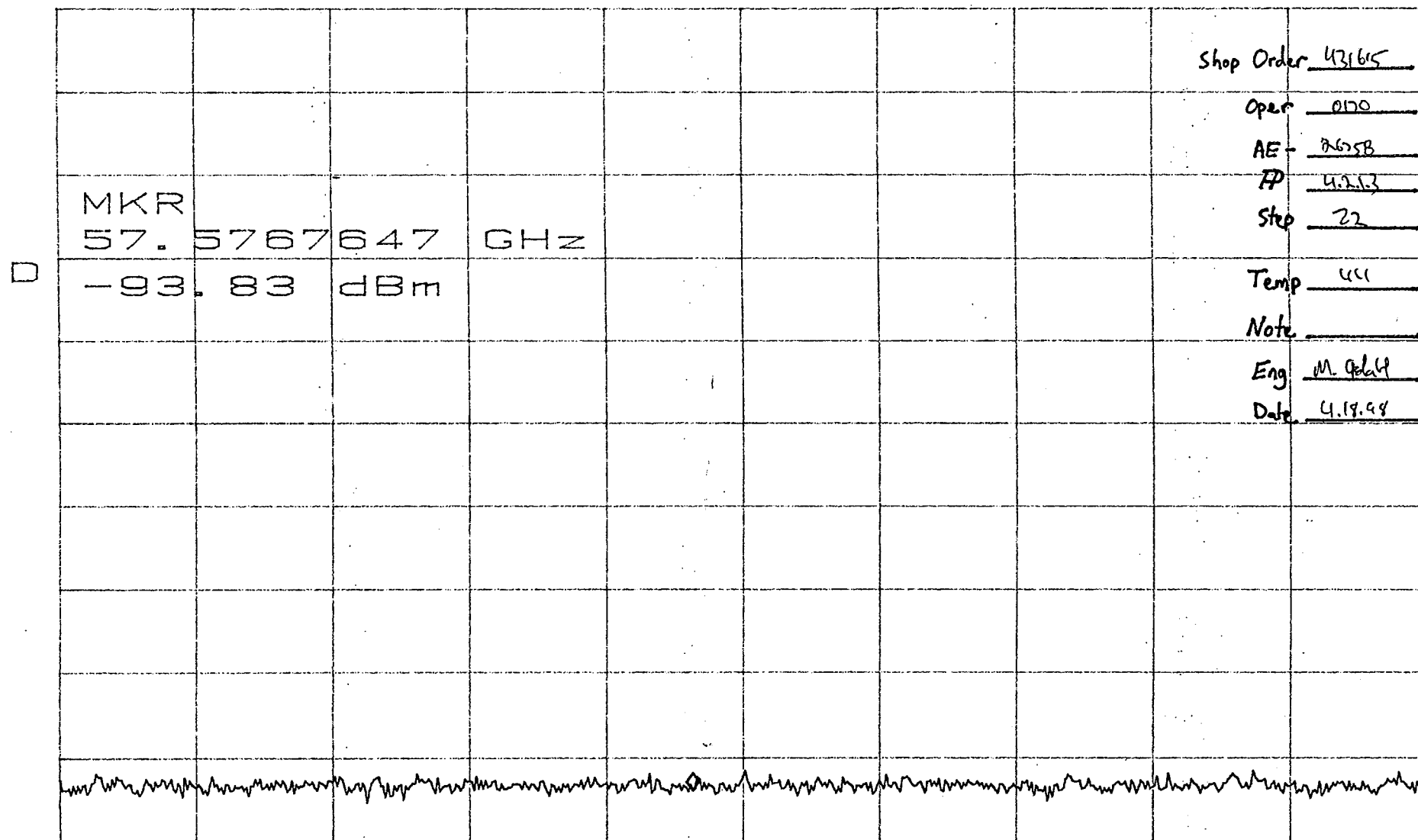
APR 20 98

7A
190

CL 30.0dB
RL 0dBm

VAVG 13
10dB/

MKR -93.83dBm
57.5767647GHz



CENTER 57.5767830GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

74
190

APR 20 1998

SWP 140ms

CL 30.0dB

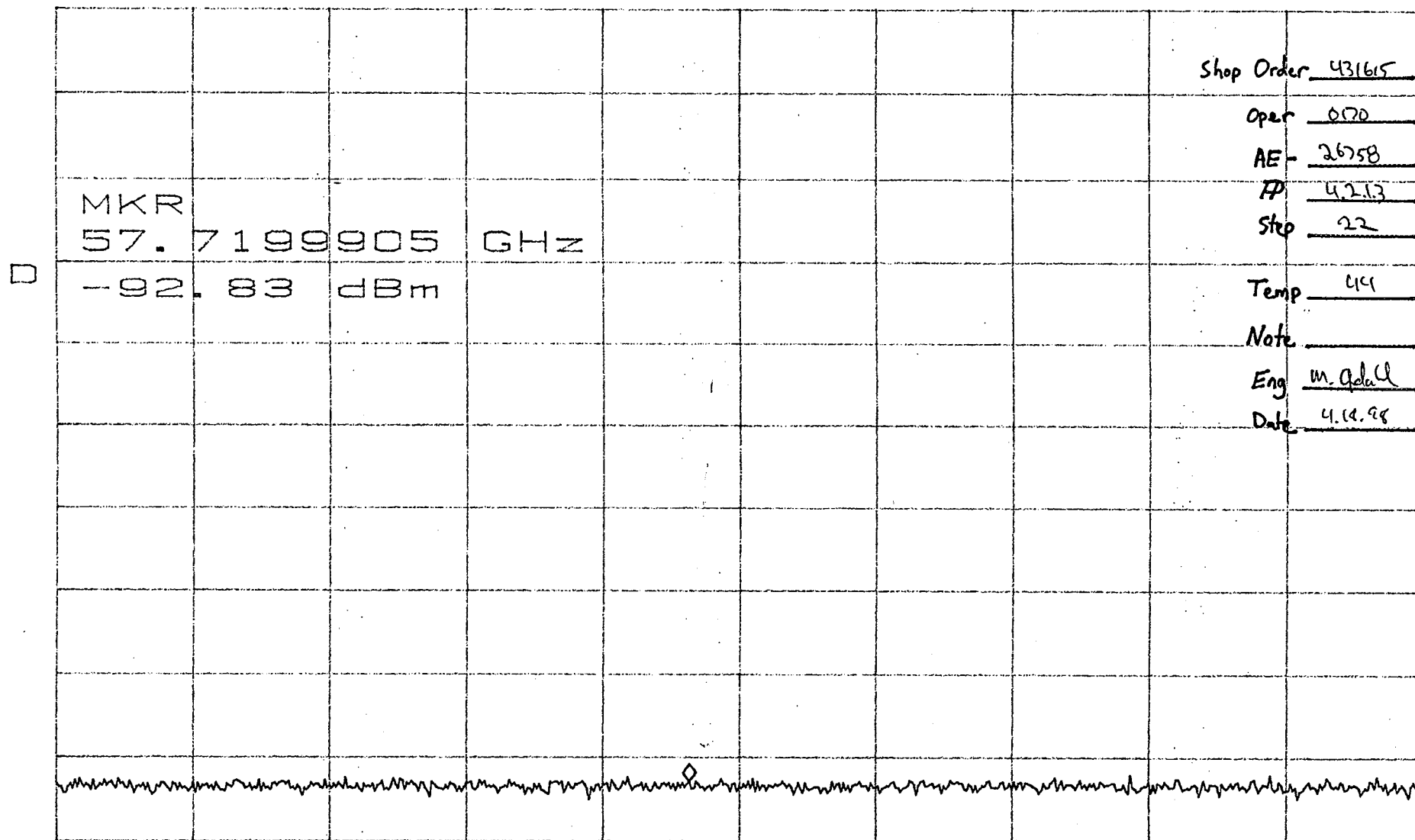
VAVG 45

MKR -92.83dBm

RL 0dBm

10dB/

57.7199905GHz



CENTER 57.7200089GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms



MKR -93.17dBm
57.8632823GHz

Shop Order 43165

Oper 0170

AE- 26758

P 4.2.13

Step 22

Temp 44

Note

Eng m. g. h.

Date 4.18.98

MKR			
57.	8032	823	GIN
193.	17	033	

CENTER 57.8632340GHz

SPAN 500.0kHz

*RBW 3.0KHz

*VBW 3. OKH

SWP 140ms

7A
190

APR 20 98

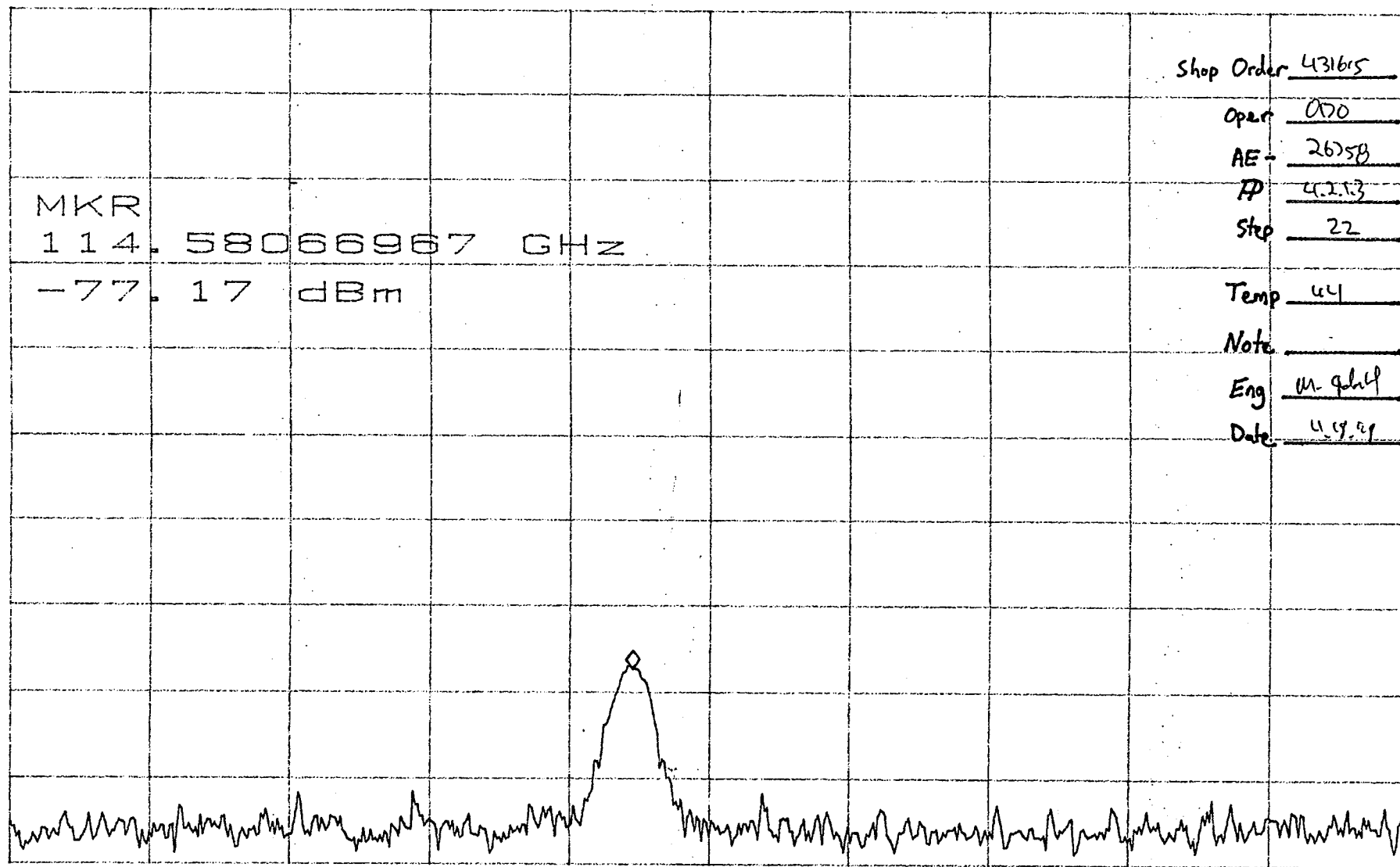
L 30.0dB

RL 0dBm

10dB/

MKR -77.17dBm

114.58066967GHz



Shop Order 431615

Oper 070

AE 26758

IP 4.2.3

Step 22

Temp 44

Note

Eng M. Ghil

Date 4.19.99

MKR

114.58066967 GHz

-77.17 dBm

CENTER 114.58067242GHz

SPAN 50.00kHz

*RBW 1.0kHz

*VBW 1.0kHz

SWP 200ms

APR 20 98

7A
190

Section 5B: Frequency and Power Hysteresis - F04

This section contains the results of a full functional test over temperature taken after the PLO (F04) was subjected to thermal cycling under vacuum and vibration.

68C

TEST DATA SHEET 8 (Sheet 1 of 4)
Functional Testing (Paragraph 4.2.1)

Test Setup Verified: STB Post-Thermal Cycling CPT
Signature: _____

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	.05V	Pass
	Spectrum Analyzer	< 1.0 Vac	.05V	Pass
	Frequency Counter Chassis	< 1.0 Vac	.04V	Pass
	Power Meter Chassis	< 1.0 Vac	.05V	Pass
4	Evacuate vacuum chamber and record pressure	< 10^{-2} torr	Pressure = _____ torr	Ambient *
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 21.8 °C	Pass
			TC2 = 21.8 °C	N/A
			TC3 = 21.8 °C	N/A
6	DRO L/A	< 1V 0 to 1 V	DRO L/A = 67 μ V	Pass
	PLO L/A	< 1V 0 to 1 V	PLO L/A = 71 μ V	Pass
	Is PLO locked?	Yes	Yes <u>X</u> No _____	Pass
7	PLO Frequency	57.290344 GHz ± 200 kHz	Freq. = 57.290340 400 GHz	Pass
	PLO Power	17 to 20 dBm	P = 19.92 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 \pm 0.1 V	VM1 = +15.01 V	Pass
	VM2 Voltage	-15 \pm 0.1 V	VM2 = -15.05 V	Pass
	IM1 Current	600 mA max.	IM1 = 527 mA	Pass
	IM2 Current	100 mA max.	IM2 = 57.8 mA	Pass
	DRO L/A Voltage	< 1V 0 to 1 V	DRO L/A = 69 μ V	Pass
	PLO L/A Voltage	< 1V 0 to 1 V	PLO L/A = 73 μ V	Pass
12	RF Output Power and Frequency	17 to 20 dBm	P = 19.91 dBm	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = 57.290340 507 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ± 2 °C	TC1 = 22.2 °C	Pass
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 \pm 0.05 V	+Voltage = 15.21 V	Pass
		-15.2 \pm 0.05 V	-Voltage = -15.19 V	Pass
		57.290344 GHz ± 200 kHz	Freq. = 57.290340 562 GHz	Pass
		17 to 20 dBm	P = 19.91 dBm	Pass

* Record data only if performing test under vacuum

TEST DATA SHEET 68C (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.80</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.41</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.290340559</u> GHz	Pass
		17 to 20 dBm	P = <u>19.72</u> dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	<i>See plots</i>	Pass
16	Power level of 114.58 GHz signal	< -10 dBm	Power of 114.58 GHz = <u>-64</u> dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = <u>1 Hz</u>	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = <u>-25</u> dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ± 2°C	TC1 = <u>1.5°C</u>	Pass
			TC2 = <u>1.9°C</u>	N/A
			TC3 = <u>1.0°C</u>	N/A
		0 - 1V	DRO L/A = <u>60</u> mV	Pass
		0 - 1V	PLO L/A = <u>66</u> mV	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>+15.0</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-15.0</u> V	Pass
	IM1 Current	600 mA max.	IM1 = <u>515</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = <u>56.6</u> mA	Pass
	DRO L/A Voltage	<u>±1V 0 to 1</u>	DRO L/A = <u>60</u> mV	Pass
	PLO L/A Voltage	<u>±1V 0 to 1</u>	PLO L/A = <u>66</u> mV	Pass
	RF Output Power	17 to 20 dBm	Power = <u>20.08</u> dBm <u>20</u> mW	Pass
	Frequency	57.290344 GHz ± 200 kHz	Freq. = <u>57.290326915</u> GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>+15.2</u> V	Pass
		-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.2903269</u> GHz	Pass
		17 to 20 dBm	Power = <u>20.08</u> dBm <u>20</u> mW	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>14.8</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-14.8</u> V	Pass
		57.290344 GHz ± 200 kHz	Freq. = <u>57.2903269</u> GHz	Pass
		17 to 20 dBm	Power = <u>20.08</u> dBm <u>20</u> mW	Pass

63C
TEST DATA SHEET (Sheet 3 of 4)
Functional Testing (Paragraph 4.2.1)

Paragraph 4.2.1.3 (Cont):

Post Thermal Cycling CPT

Step	Test	Expected	Measured	Pass/Fail
19 (Cont)	Spurious and Sub	-200 to -90 dBc	<i>See Plots</i>	<i>Pass</i>
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = -66 dBm	<i>Pass</i>
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 3 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .36 dB <i>Per</i>	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 45.0	<i>Pass</i>
			TC2 = 45.6	N/A
			TC3 = 44.7	N/A
		0 - 1V	DRO L/A = .120 V	<i>Pass</i>
		0 - 1V	PLO L/A = .109 V	<i>Pass</i>
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	<i>Pass</i>
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	<i>Pass</i>
	IM1 Current	600 mA max.	IM1 = 541 mA	<i>Pass</i>
	IM2 Current	100 mA max.	IM2 = 59.4 mA	<i>Pass</i>
	DRO L/A Voltage	+15.0 to 1 V	DRO L/A = .120 V	<i>Pass</i>
	PLO L/A Voltage	+15.0 to 1 V	PLO L/A = .109 V	<i>Pass</i>
	RF Output Power and	17 to 20 dBm	Power = 20 dBm	<i>Pass</i>
	Frequency	57.290344 GHz ± 200 kHz	Freq. = 57.290 337 GHz	<i>Pass</i>
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	<i>Pass</i>
		-15.2 ± 0.05 V	-Voltage = -15.2 V	<i>Pass</i>
		57.290344 GHz ± 200 kHz	Freq. = 57.290 337 GHz	<i>Pass</i>
		17 to 20 dBm	Power = 20 dBm	<i>Pass</i>
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	<i>Pass</i>
		-14.8 ± 0.05 V	-Voltage = -14.8 V	<i>Pass</i>
		57.290344 GHz ± 200 kHz	Freq. = 57.290 337 GHz	<i>Pass</i>
		17 to 20 dBm	Power = 20 dBm	<i>Pass</i>

SHEET 23 OF 34
 REC NO. 1675

AE-26758A
 21 Jan 98

68C
TEST DATA SHEET (Sheet 4 of 4)
 Functional Testing (Paragraph 4.2.1)

Post Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Spurious and Sub	-200 to -90 dBc	See plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	Power of 114.58 GHz = _____ dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = .72 dB Peak	N/A

Shop Order No.: 431618
 Operation: 170
 Unit Serial No.: F04
 Date: 4-18-98

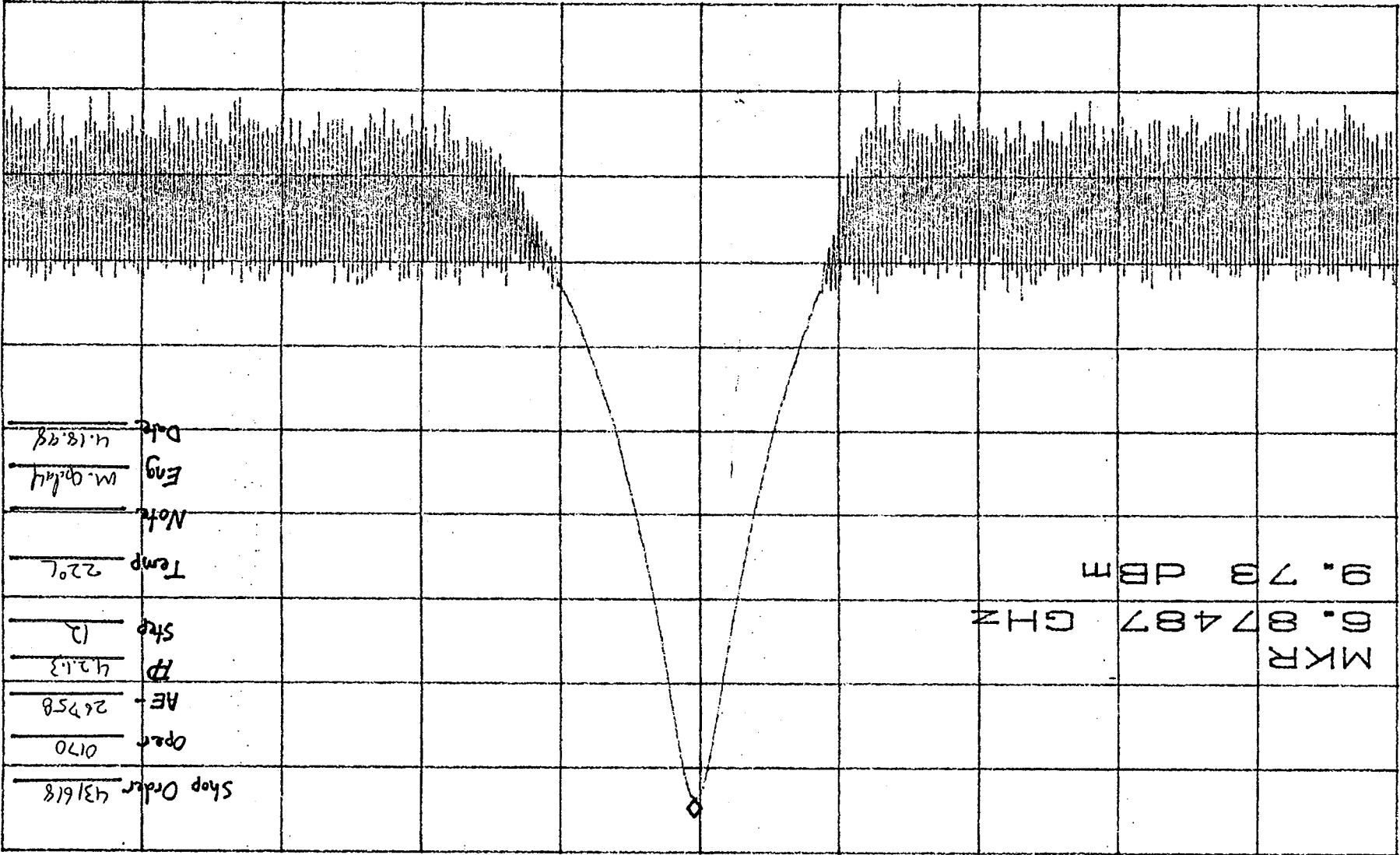
Test Engineer: Mark Oshahl
 Quality Assurance: Control 4/20/98 (7A 190)
 Govt. Rep. 7-30-98 (7A 190)
 DCMC: _____

ATTEN 30dB

RL 15.9dBm

MKR 9.73dBm

6.87487GHz



Shop Order 431618

Oper 0170

AE 26958

HP 42.13

Step 12

Temp 22°C

Note

Eng M. G. 4/4

Date 4.18.98

CENTER 6.87480GHz

SPAN 20.00MHz

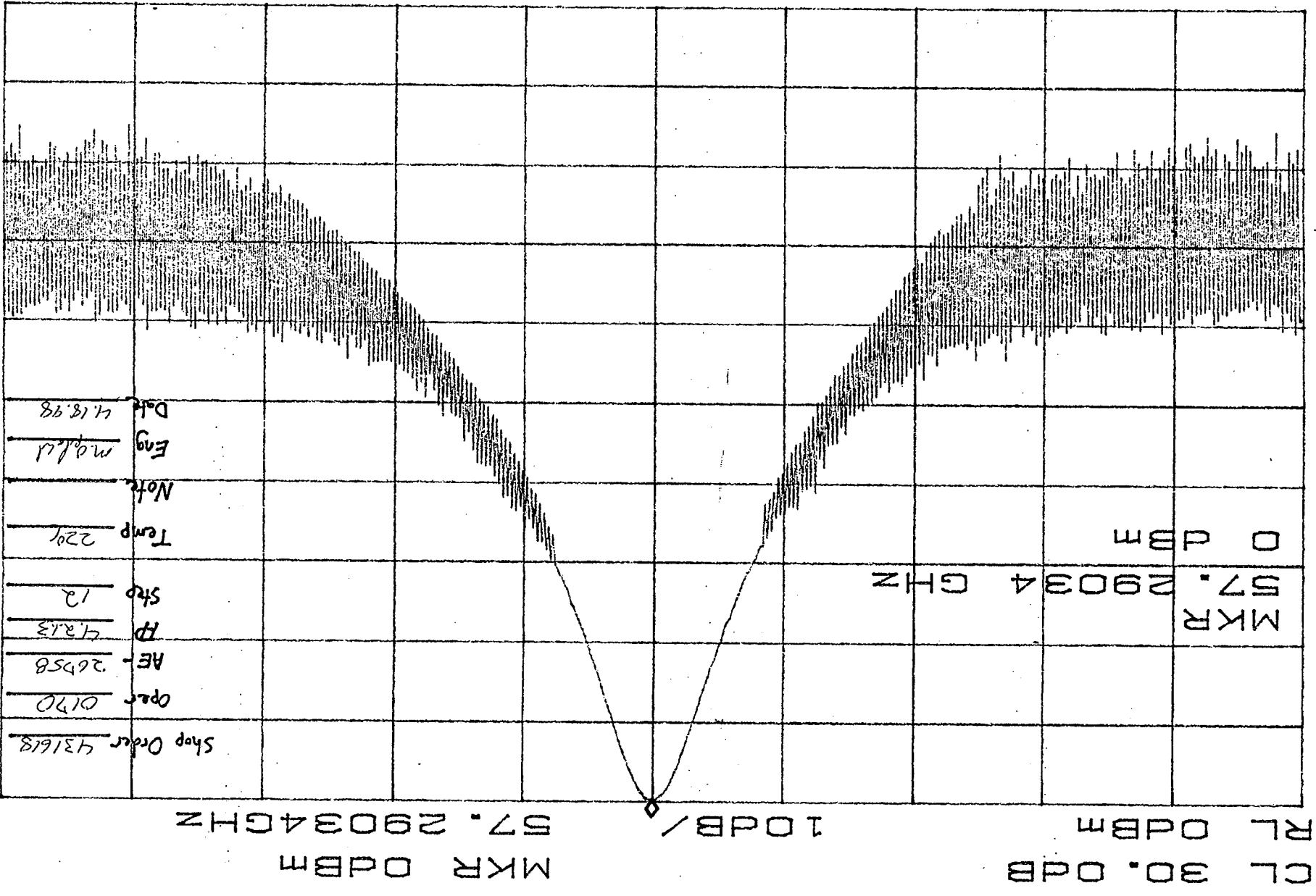
RBW 300kHz

VBW 300kHz

SWP 50.0ms

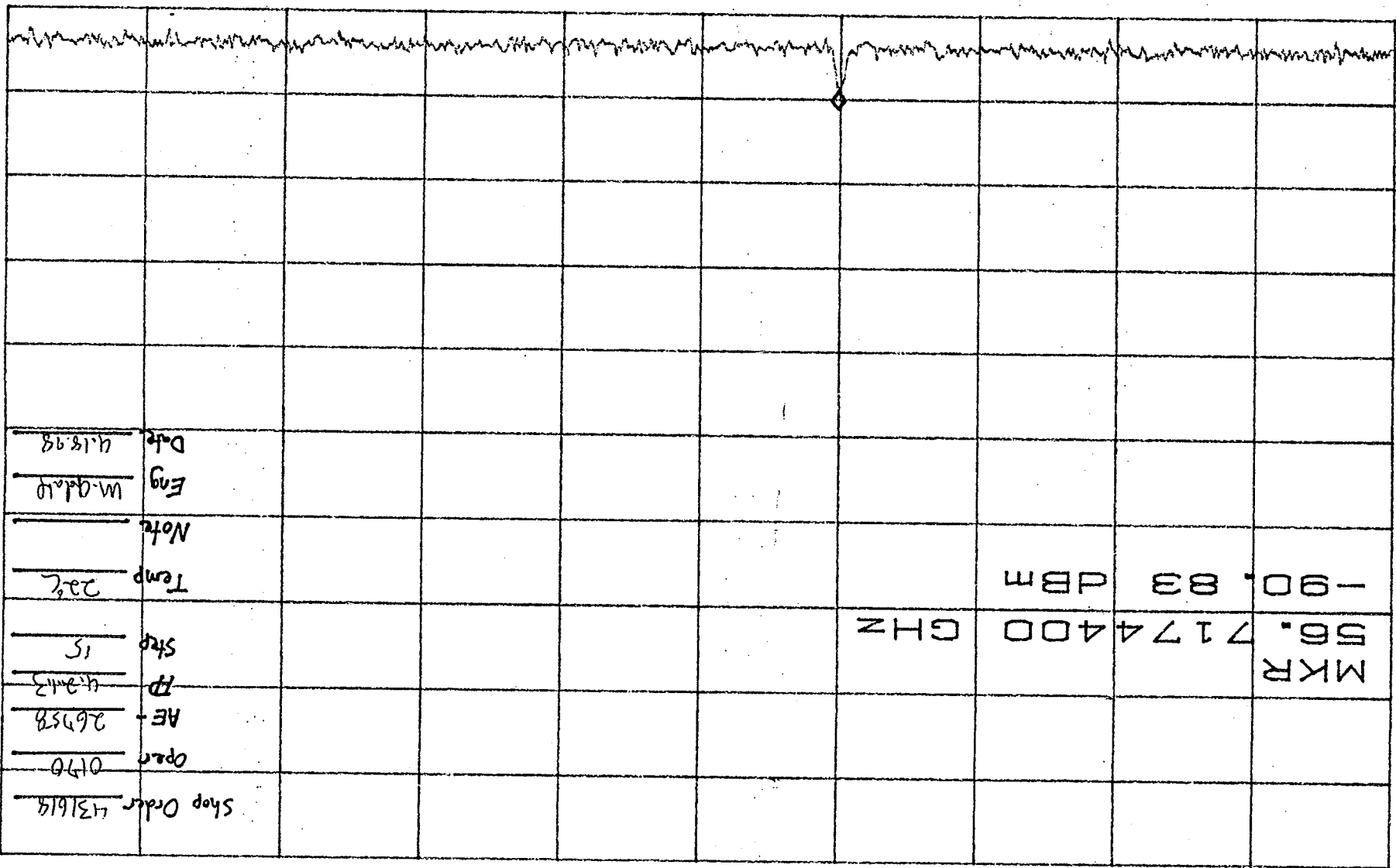
190

4/20/98



CENTER 57.29034GHZ
SPAN 10.00MHZ
*RBW 300KHZ *VBW 300KHZ
SWP 50.0ms
4/20/98
7A 180

CL 30.0dB VAVG 100 MKR -90.83dBm
 RL 0dBm 10dB/ 56.7174400GHz



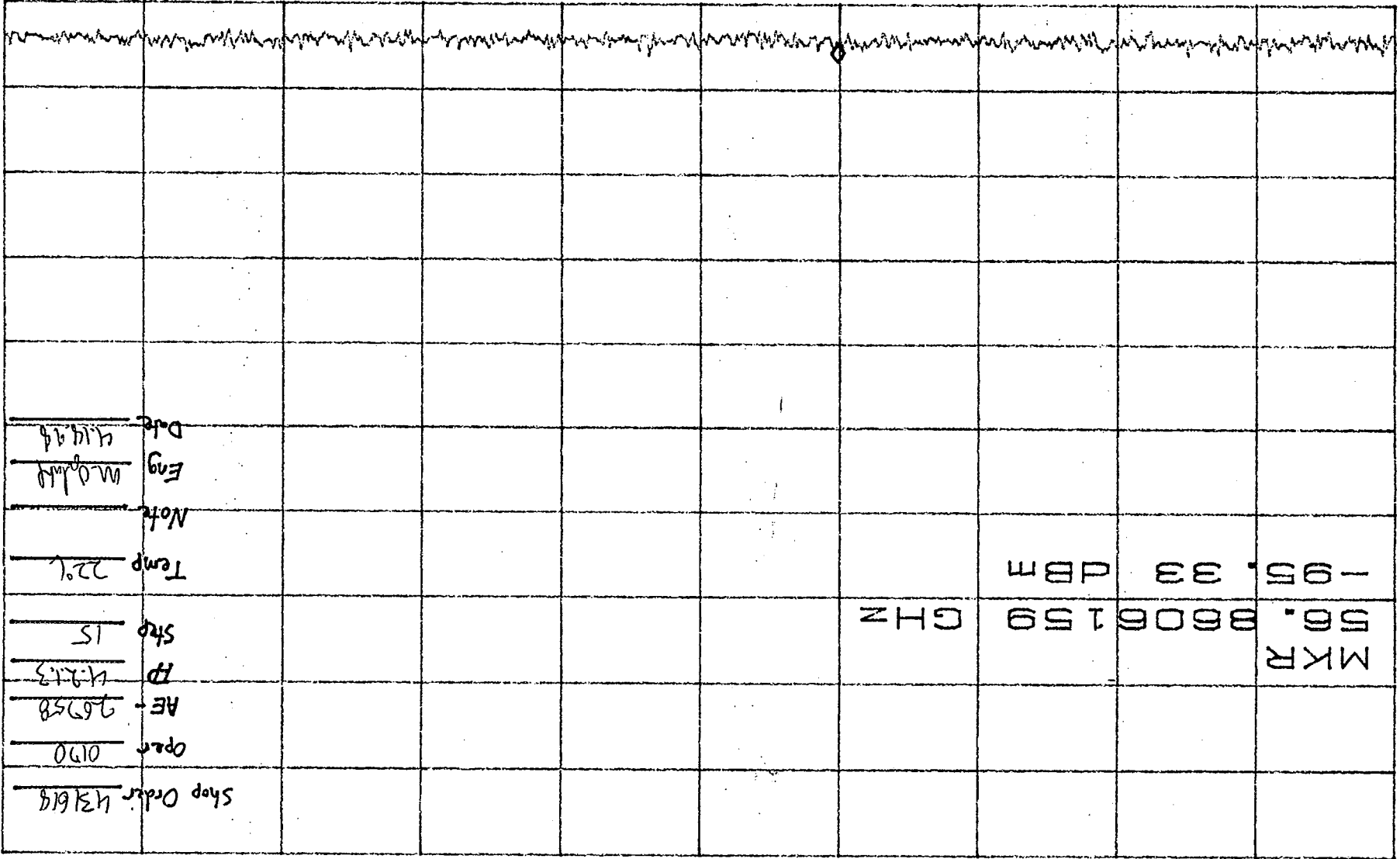
Shop Order 431614
 Oper 0170
 AE 26758
 ID 4.2m13
 Step 15
 Temp 22°C
 Note
 Eng M. Q. 14
 Date 4.18.98

CENTER 56.7174892GHz
 SPAN 500.0KHz
 *RBW 3.0KHz *VBW 3.0KHz
 SWP 140ms

190
 24
 4/20/98

CL 30.0dB VAVG 100 MKR -95.33dBm
RL 0dBm

56.8606159GHz



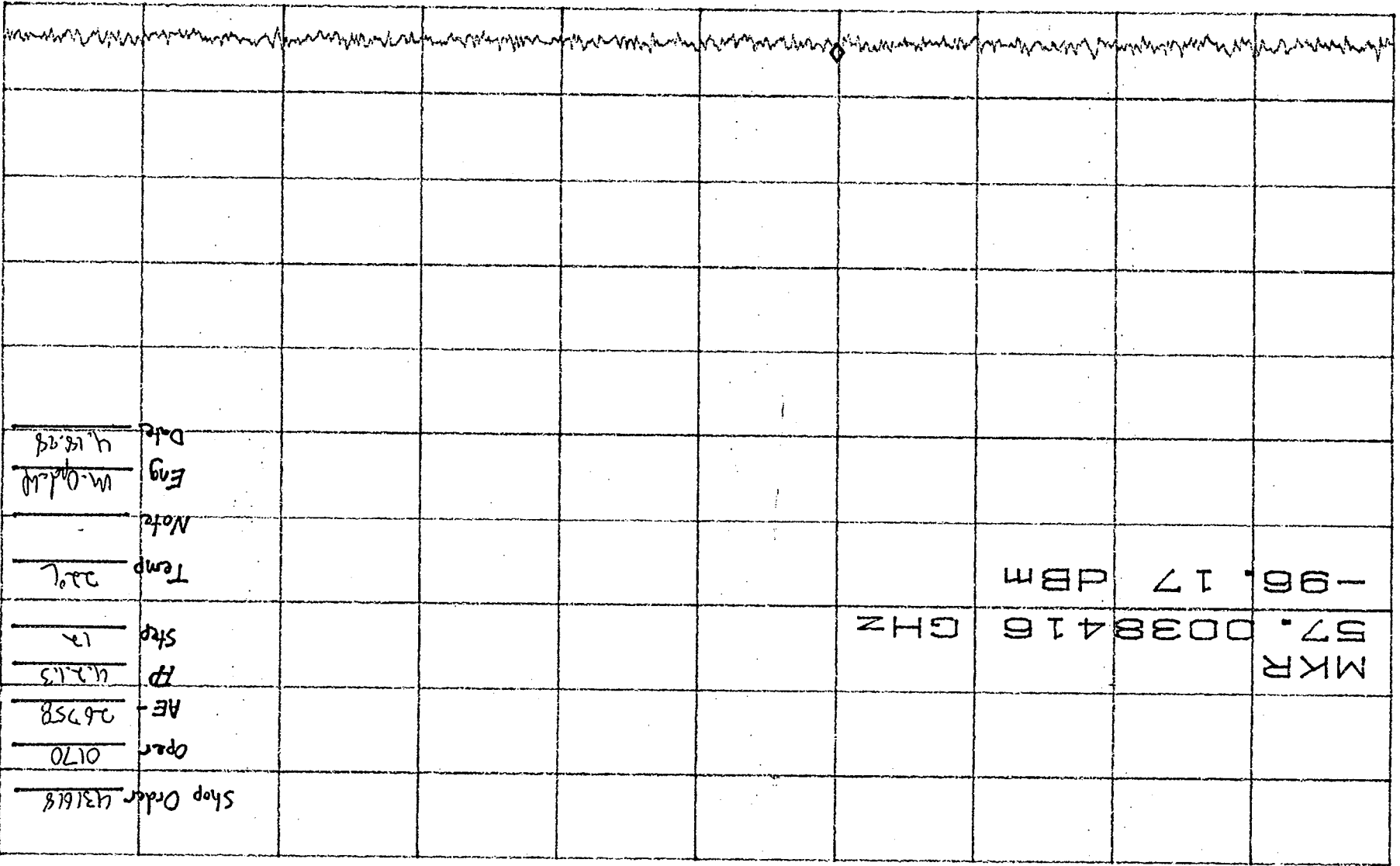
Shop Order 43619
Open 0170
AE 75758
HP 4213
Step 15
Temp 22°C
Note
Eng M. J. M.
Date 4/14/94

CENTER 56.8606650GHz
SPAN 500.0KHz
*RBW 3.0KHz *VBW 3.0KHz
SWP 140MHz

4/20/94



CL 30.0dB VAVG 65 MKR -96.17dBm 57.0038416GHz RL 0dBm

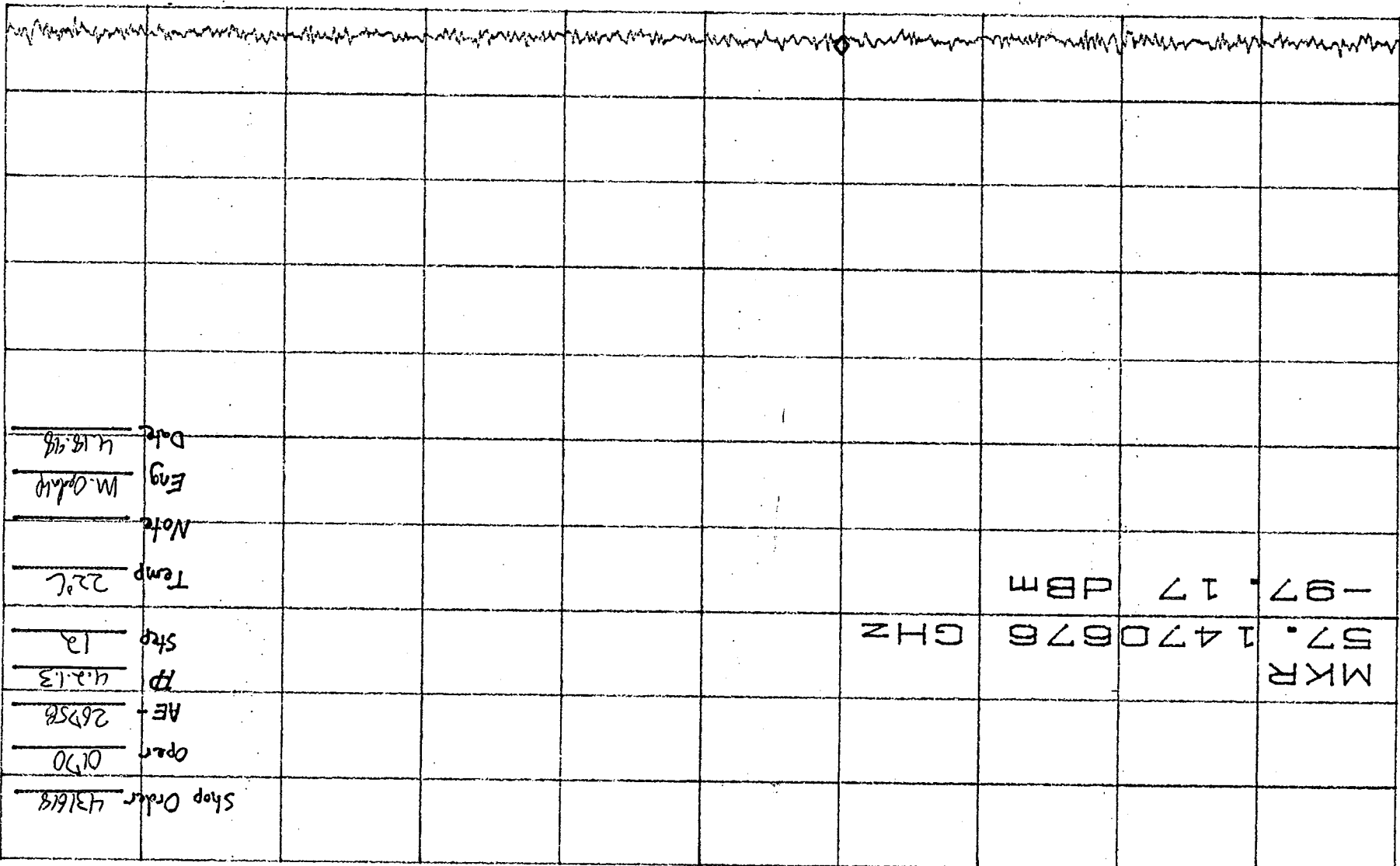


Shop Order 431618
 Oper 0170
 AE 26758
 HP 4.2.13
 Step 12
 Temp 22°C
 Note
 Eng W. O. L. M.
 Date 4.18.98

CENTER 57.0038908GHz SPAN 500.0KHz *RBW 3.0KHz *VBW 3.0KHz SWP 140ms

24 190
 4/20/98

CL 30.0dB VAVG 100 MKR -97.17dBm
 RL 0dBm 10dB/ 57.1470676GHz



CENTER 57.1471168GHz
 *RBW 3.0KHz *VBW 3.0KHz
 SPAN 500.0KHz
 SWP 140ms

4/20/98
 180

CL 30.0dB
RL 0dBm

VAVG 80
10dB/

MKR -95.33dBm
57.5767448GHz

D

MKR
57.5767448 GHz
-95.33 dBm

Shop Order 43/619

Oper 0170

AE 26758

FP 4.2.63

Step 15

Temp 22°C

Note >

Eng M. Ordal

Date 4/18/98



CENTER 57.5767940GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms

4/20/98 (24/190)

CL 30.0dB
RL 0dBm

VAVG 100
10dB/

MKR -96.50dBm
57.8631969GHz

D

MKR
57.8631969 GHz
-96.50 dBm

Shop Order 431614

Oper 0170

AE 26758

FP 4.2.13

Step 15

Temp 22°C

Note _____

Eng m.gdahl

Date 4.19.98

CENTER 57.8632460GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

7A
190
4/20/98

CL 30.0dB
RL 0dBm

VAVG 100
10dB/

MKR -96.17dBm
57.7199710GHz

D

MKR
57.7199710 GHz
-96.17 dBm

Shop Order 431618

Oper 0170

AE 26750

TP 4.2.13

Step 15

Temp 22°C

Note

Eng M. Gohall

Date 4.18.98

CENTER 57.7200202GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 140ms

4/20/98 (06L 1/2)

CL 30.0dB

RL 0dBm

10dB/

MKR -68.00dBm

114.58068458GHz

MKR

114.58068458 GHz

-68.00 dBm

Shop Order 431614

Oper 0170

AE 26758

TP 4.2.1.3

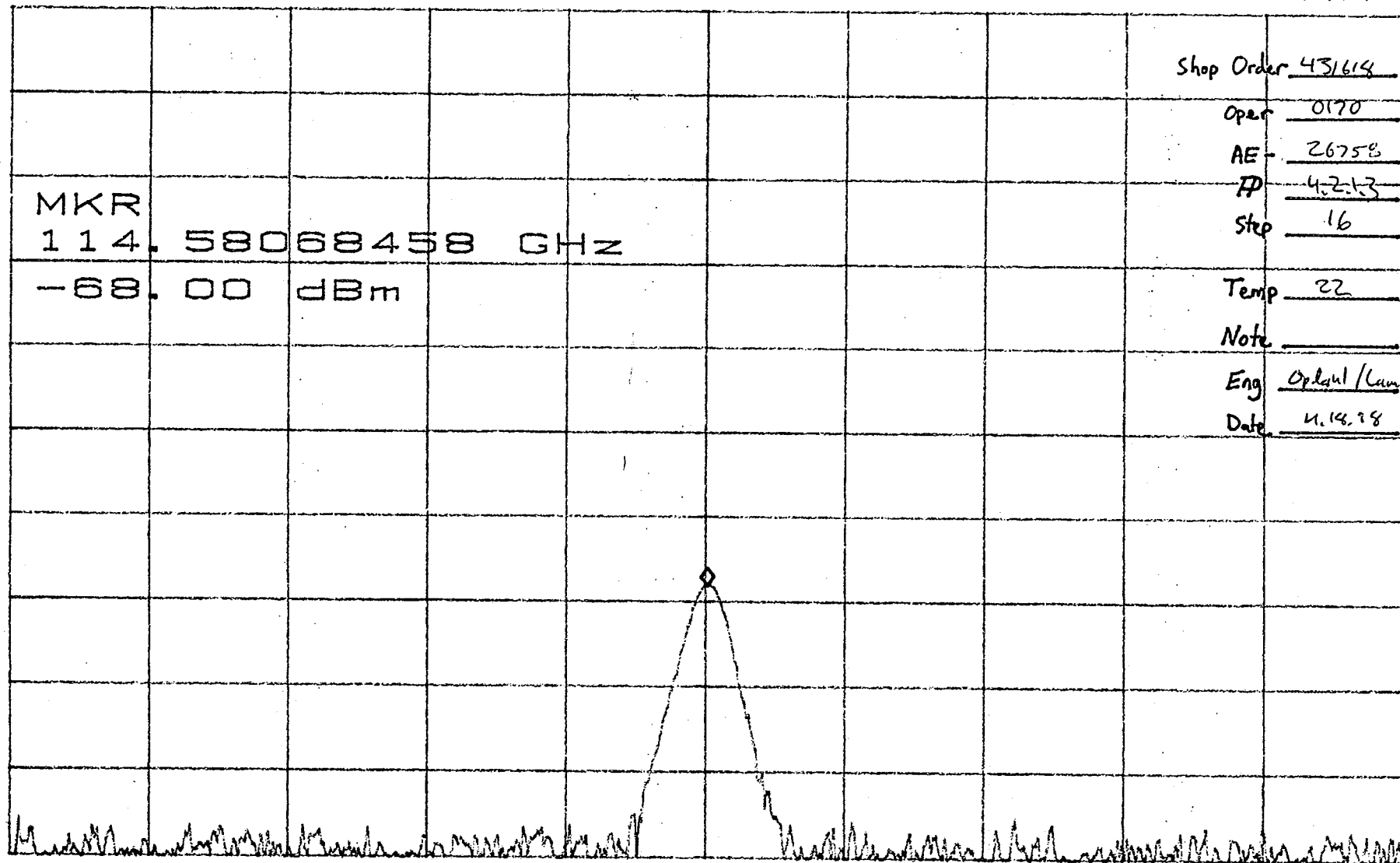
Step 16

Temp 22

Note _____

Eng Opland / Lumbert

Date 4.18.98



CENTER 114.58068450GHz

SPAN 50.00kHz

*RBW 1.0kHz

*VBW 1.0kHz

SWP 200ms

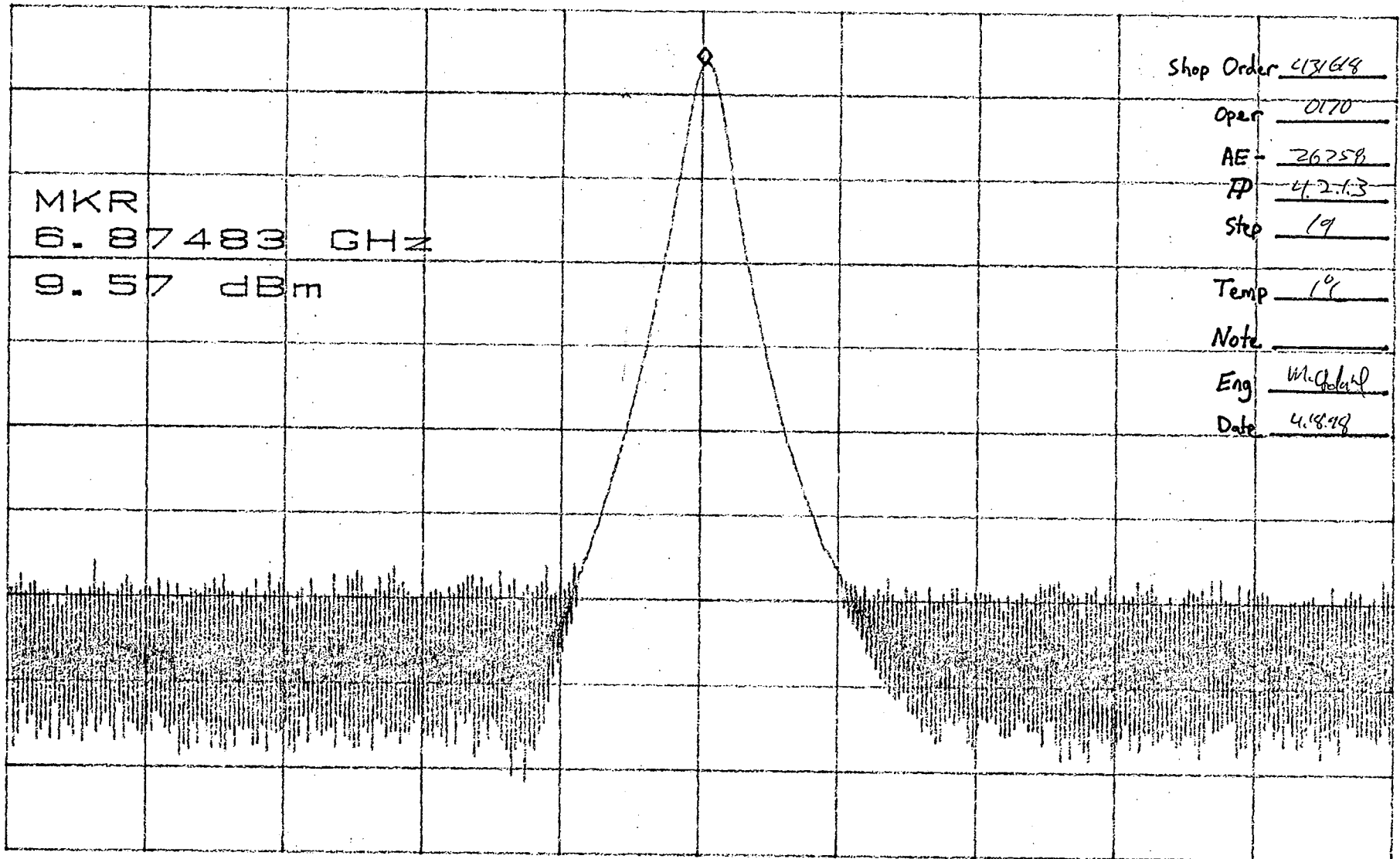
7A
190

4/20/98

ATTN 30dB
RL 15.9dBm

10dB/

MKR 9.57dBm
6.87483GHz



CENTER 6.87480GHz

SPAN 20.00MHz

RBW 300kHz

VBW 300kHz

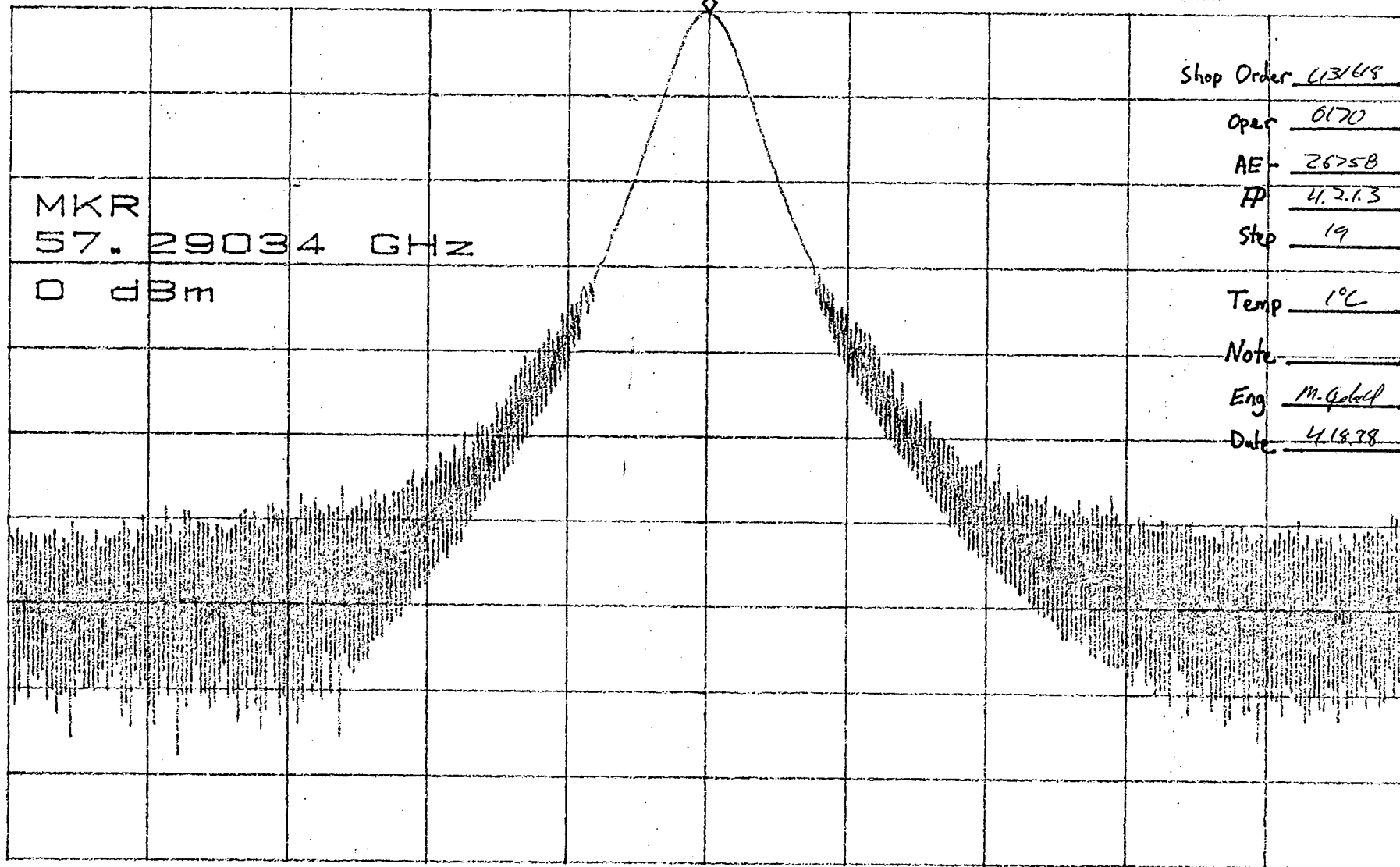
SWP 50.0ms

4/20/98 7A 190

L 30.0dB
BPO 00
RL 0dBm

10dB/

MKR 0dBm
57.29034GHz



CENTER 57.29034GHz
*RBW 300kHz VBW 300kHz

SPAN 10.00MHz
SWP 50.0ms

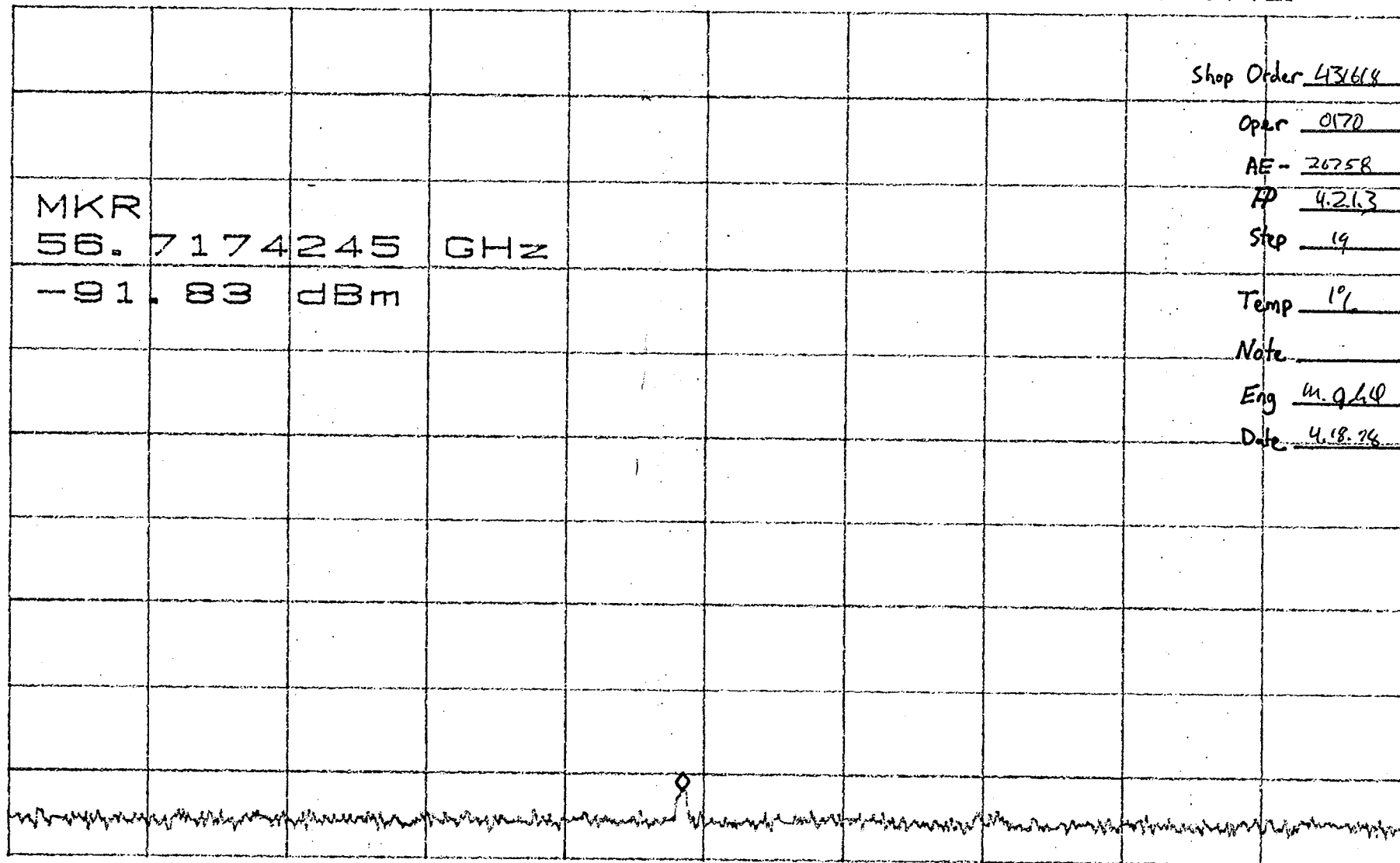
4/20/78 (74/190)

CL 30.0dB
RL 0dBm

VAVG 100
10dB/

MKR -91.83dBm
56.7174245GHz

D



Shop Order 431618

Oper 0170

AE 26758

AP 4.213

Step 19

Temp 1%

Note

Eng m. g. l. q.

Date 4.18.78

CENTER 56.7174320GHz

SPAN 500.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 140ms

4/20/98 (24)

CL 30.0dB
BPO 0.0
RL 0dBm

VAVG 30
10dB/

MKR -95.50dBm
56.8606512GHz

D

MKR
56.8606512 GHz
-95.50 dBm

Shop Order 431618

Oper 0170

AE 26758

IP 4.2.1.3

Step 19

Temp 1°C

Note _____

Eng M. G. L. L.

Date 4.18.98

CENTER 56.8606587GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

74
190 4/20/98

CL 30.0dB
RL 0dBm

VAVG 50
10dB/

MKR -95.33dBm
57.0038770GHz

D

MKR
57.0038770 GHz
-95.33 dBm

Shop Order 431618

Oper 0170

AE 26758

TP 4.2.1.3

Step 17

Temp 1°C

Note _____

Eng M. Ophel

Date 4.18.98

CENTER 57.0038845GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms

4/20/94 (7A 190)

CL 30.0dB

VAVG 38

MKR -96.00000

57. 1471025GHz

MKR

57. 1 47 1 025 GHN

-96.00 dBm

Shop Order 431618

Oper 0170

AE - 26758

4.2.1.3

Step 19

Temp 1°C

Note _____

Eng M. G. J. C.

Date 4-18-98

CENTER 57.1471100GHz

*RBW 3. OKHN

*VBW 3.0KHz

SPAN 500.0KHZ

SWP 140ms



4/20/98

CL 30.0dB
RL 0dBm

VAVG 61
10dB/

MKR -95.83dBm
57.4335545GHz

D

MKR
57.4335545 GHz
-95.83 dBm

Shop Order 431619

Oper 0170

AE 26258

FP 4.2.63

Step 19

Temp 19

Note 1

Eng M. G. G. G.

Date 4.18.98

CENTER 57.4335620GHz

SPAN 500.0KHz

SWP 140ms

4/20/98 (7A 190)

CL 30.0dB
RL 0dBm

VAVG 14
10dB/

MKR -96.17dBm
57.5767795GHz

D

MKR
57.5767795 GHz
-96.17 dBm

Shop Order 431614

Oper 0170

AE 20758

AP 4213

Stop 19

Temp 10C

Note _____

Eng M. G. L. L.

Date 4.18.88

CENTER 57.5767870GHz

SPAN 500.0kHz

SWP 140ms

4/20/93 (24 190)

CL 30.0dB
RL 0dBm

VAVG 24
10dB/

MKR -94.67dBm
57.8632315GHz

D

MKR
57.8632315 GHz
-94.67 dBm

Shop Order 43648

Oper 0150

AE 26258

TP 4.21.3

Step 19

Temp 1°C

Note

Eng M. G. Galt

Date 4.18.98

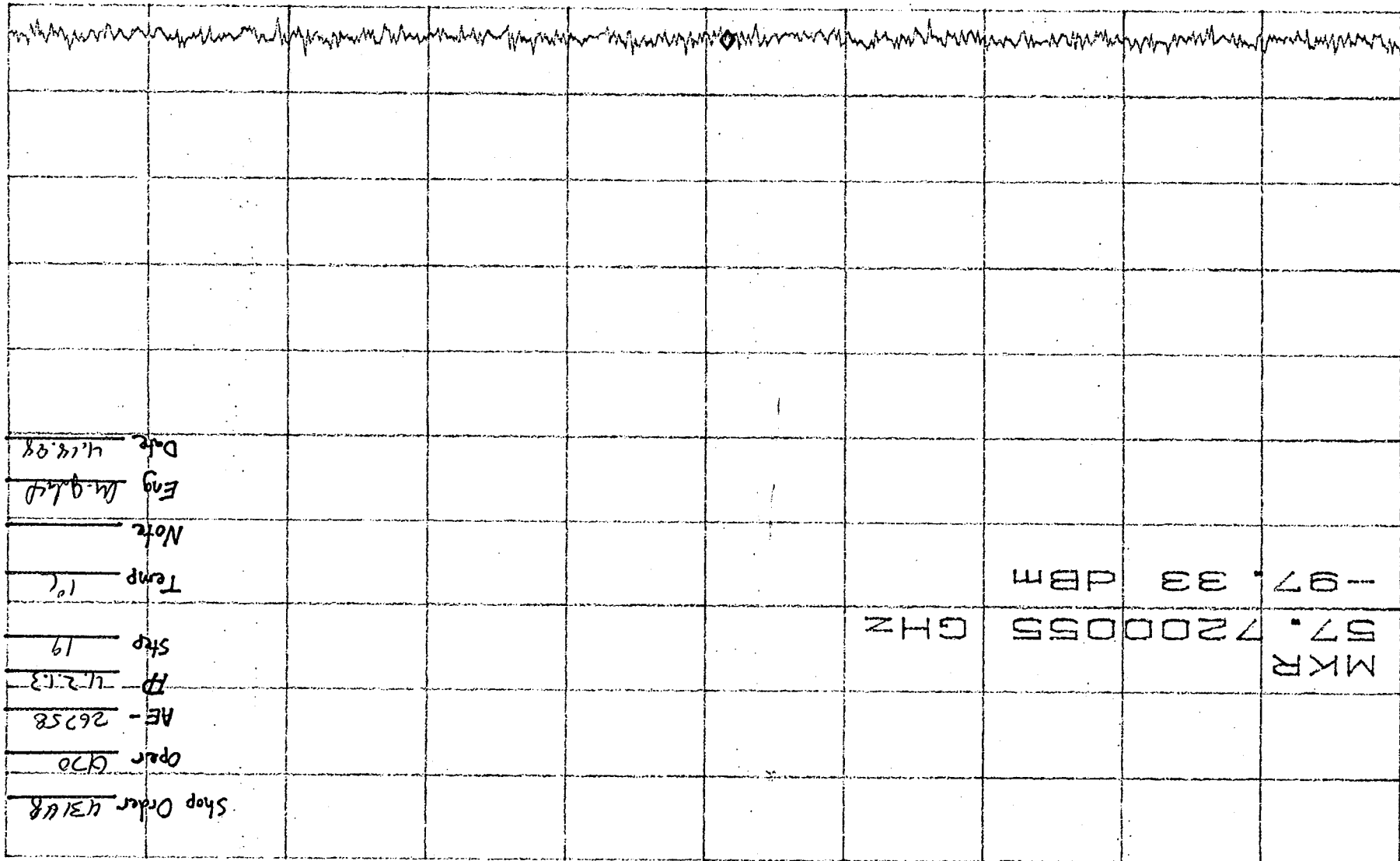
CENTER 57.8632390GHz

SPAN 500.0KHz

SWP 140ms

74
190 4/20/98

CL 30.0dB VAVG 22 MKR -97.33dBm
RL 0dBm 10dB/ 57.7200055GHz



Shop Order 43148
Opair G70
AE - 26258
HP 4.213
Step 19
Temp 10
Note
Eng M. G. L. 4
Date 4.14.98

CENTER 57.7200130GHz

SPAN 500.0KHz
SWP 140ms

4/20/98
7A 190

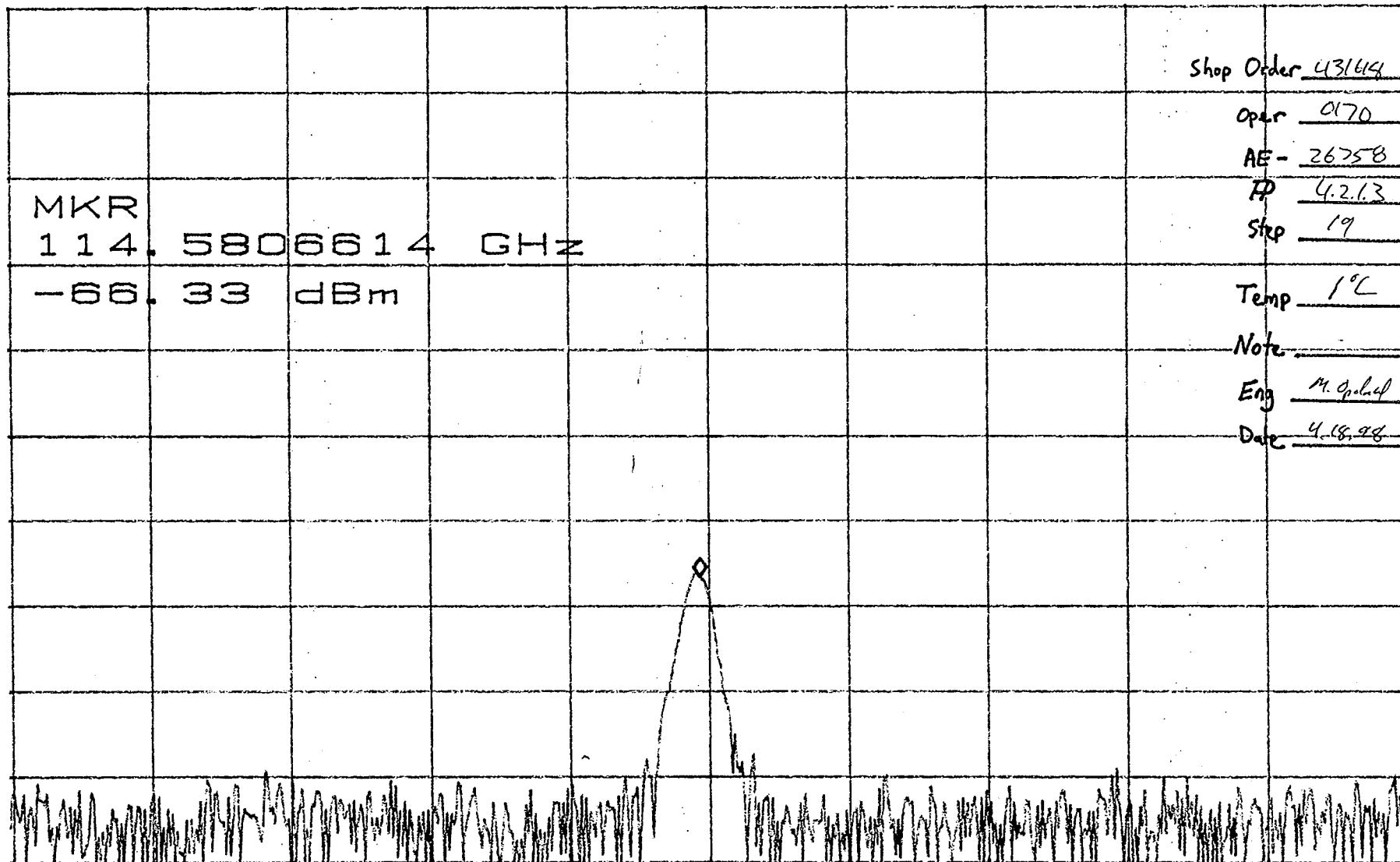
CL 30.0dB

RL 0dBm

10dB/

MKR -66.33dBm

114.5806614GHz



Shop Order 43664

Oper 0170

AE- 26758

TP 4.2.1.3

Shp 19

Temp 1°C

Note

Eng M. Goluch

Date 4-18-98

MKR
114.5806614 GHz
-66.33 dBm

CENTER 114.5806624GHz

SPAN 200.0KHz

*RBW 3.0KHz

*VBW 3.0KHz

SWP 67.0ms

7A
190

4/20/98

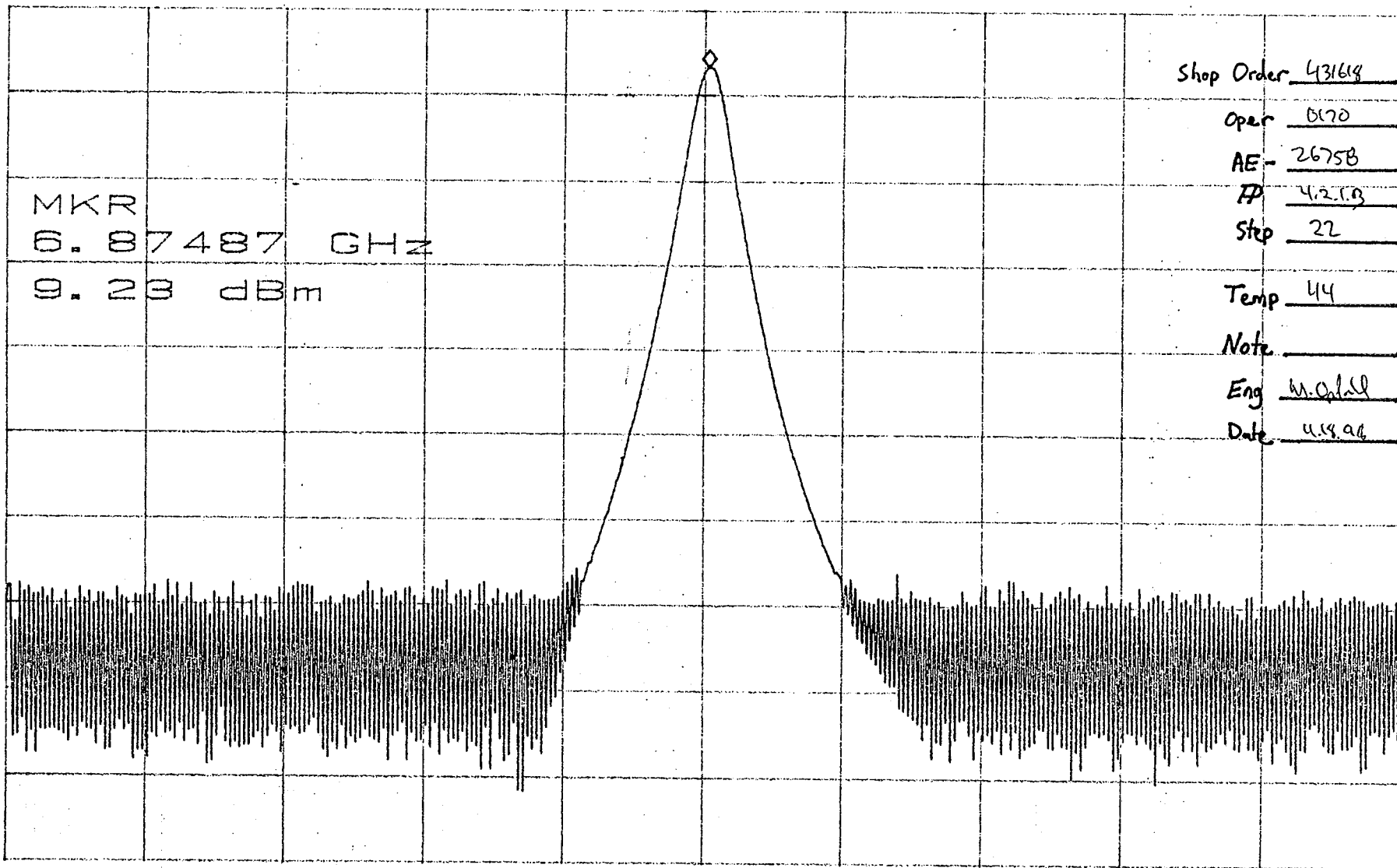
ATTEN 30dB

RL 15.9dBm

10dB/

MKR 9.23dBm

6.87487GHz



CENTER 6.87480GHz

SPAN 20.00MHz

RBW 300kHz

VBW 300kHz

SWP 50.0ms

7A 190 4/20/98

L 30.0dB

RL 0dBm

MKR 0dBm

57.29034GHz

10dB/

MKR

57.29034 GHz

0 dBm

Shop Order 431618

Oper 676

AE 26758

TP 4213

Step 22

Temp 44

Note _____

Eng M. Phal

Date 4/19/94

CENTER 57.29034GHz

SPAN 10.00MHz

*RBW 300kHz

VBW 300kHz

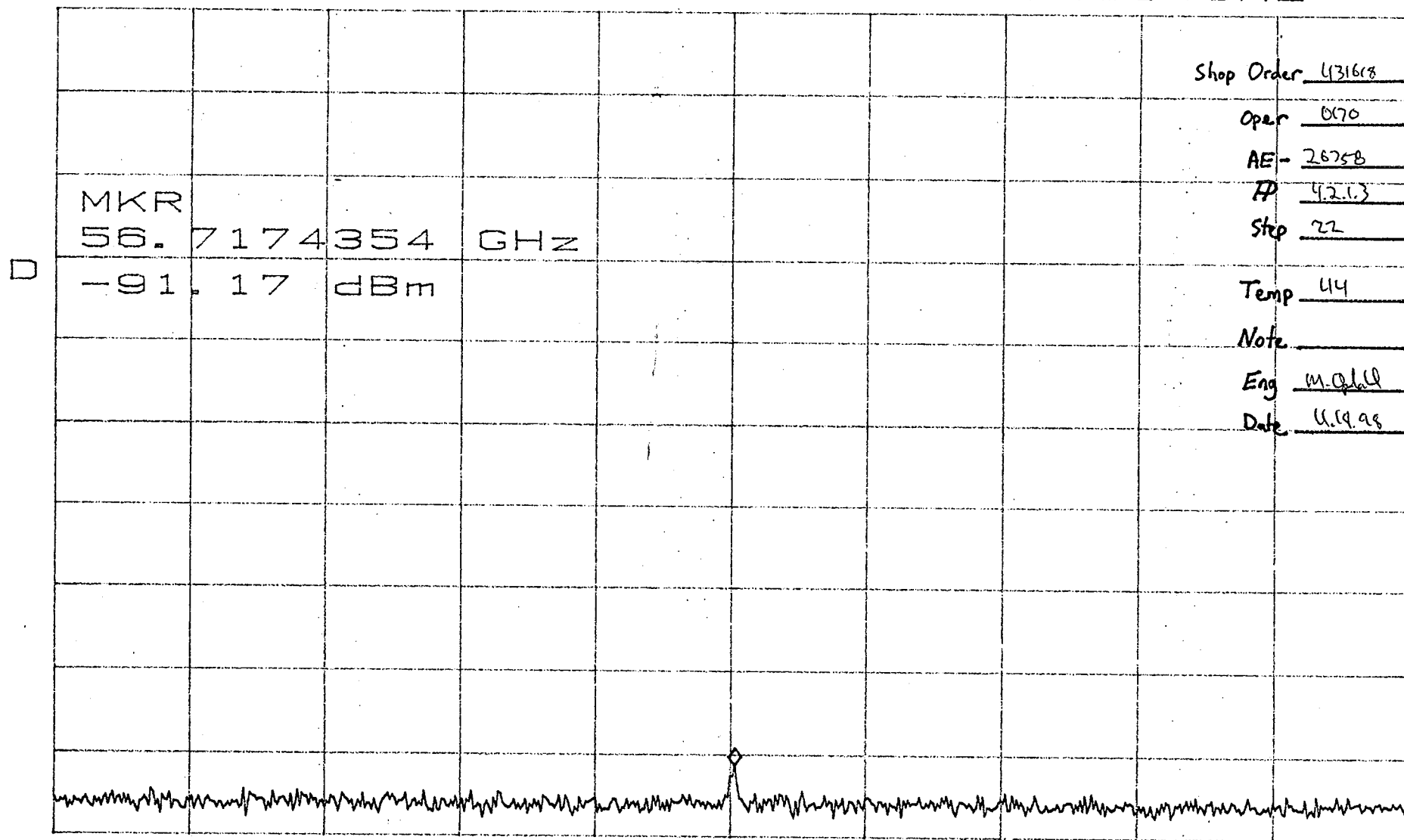
SWP 50.0ms

4/20/94 (24)

CL 30.0dB
RL 0dBm

VAVG 100
10dB/

MKR -91.17dBm
56.7174354GHz

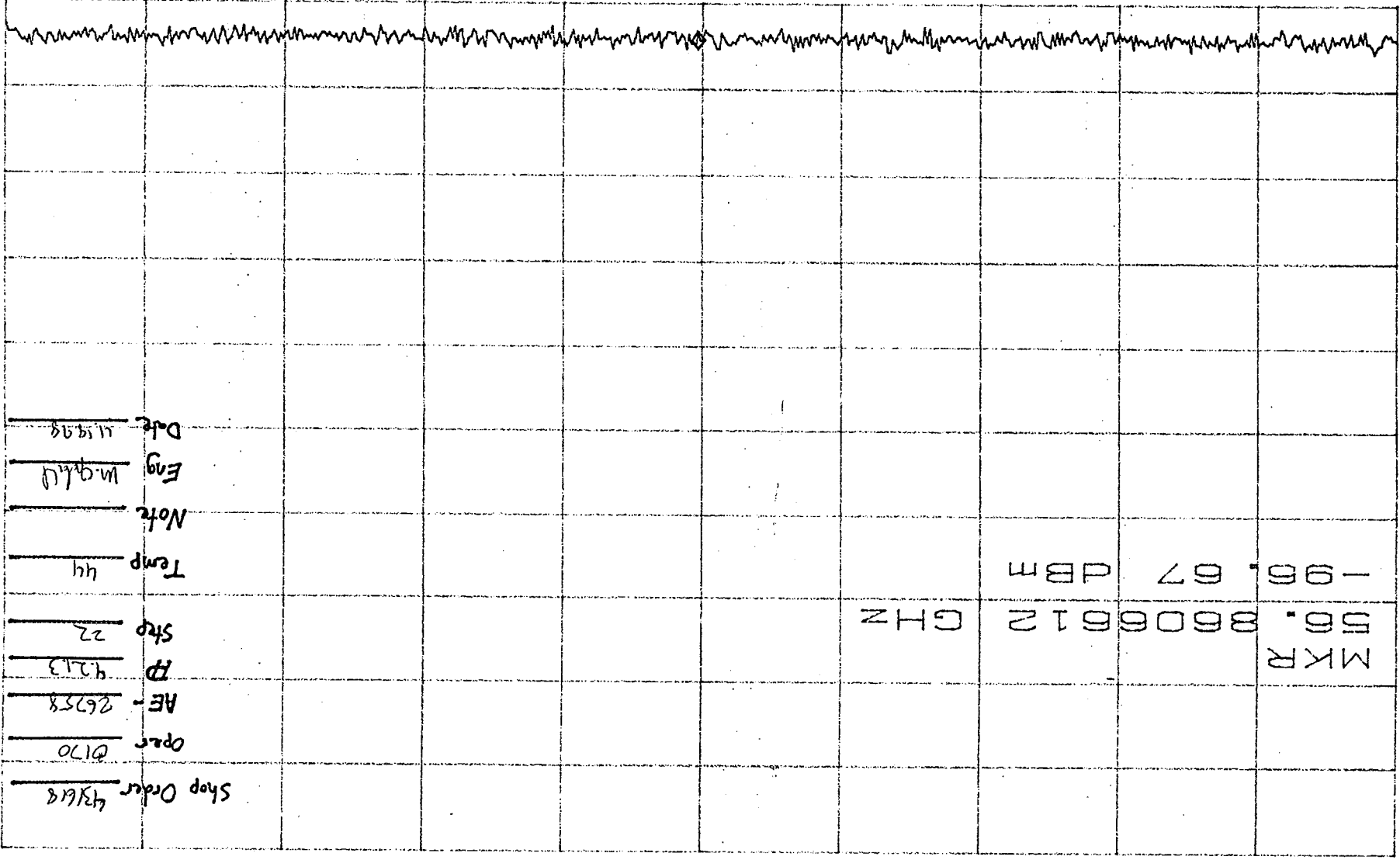


CENTER 56.7174337GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms

4/20/98 (7A 190)

CL 30.0dB VAVG 100 MKR -96.67dBm
 RL 0dBm 10dB/ 56.8606612GHz



CENTER 56.8606595GHz
 SPAN 500.0KHz
 *RBW 3.0KHz *VBW 3.0KHz
 SWP 140ms

7A 190

CL 30.0dB

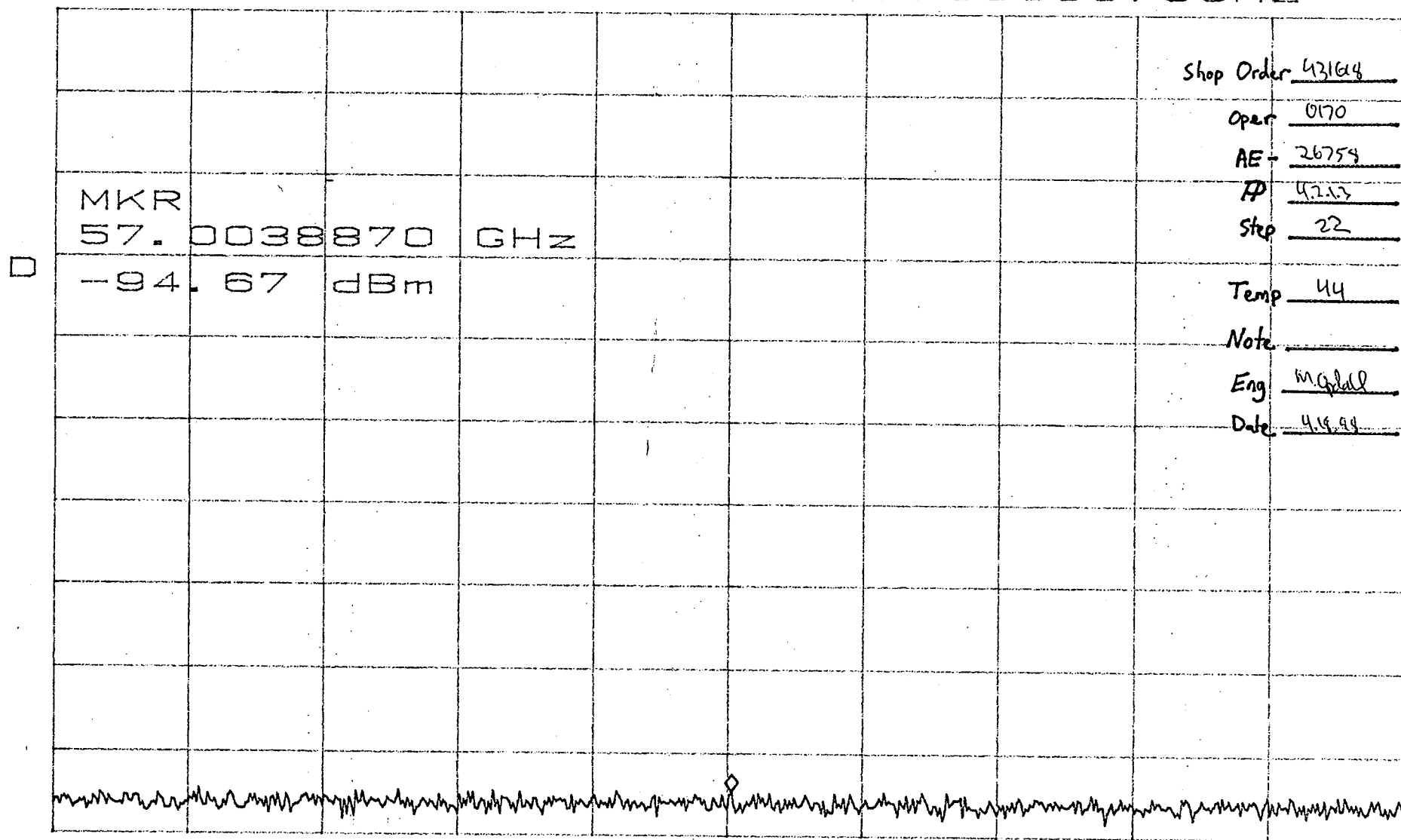
VAVG 20

MKR -94.67dBm

RL 0dBm

10dB/

57.0038870GHz



CENTER 57.0038854GHz

SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

4/22/98 (7A 190)

CL 30.0dB
RL 0dBm

VAVG 24
10dB/

MKR -95.83dBm
57.1471129GHz

D

MKR
57.1471129 GHz
-95.83 dBm

Shop Order 43164

Oper 0170

AE 2675B

IP 4.2.13

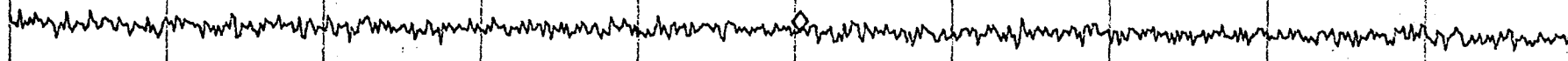
Step 22

Temp 44

Note

Eng M. G. Hse

Date 4.14.98

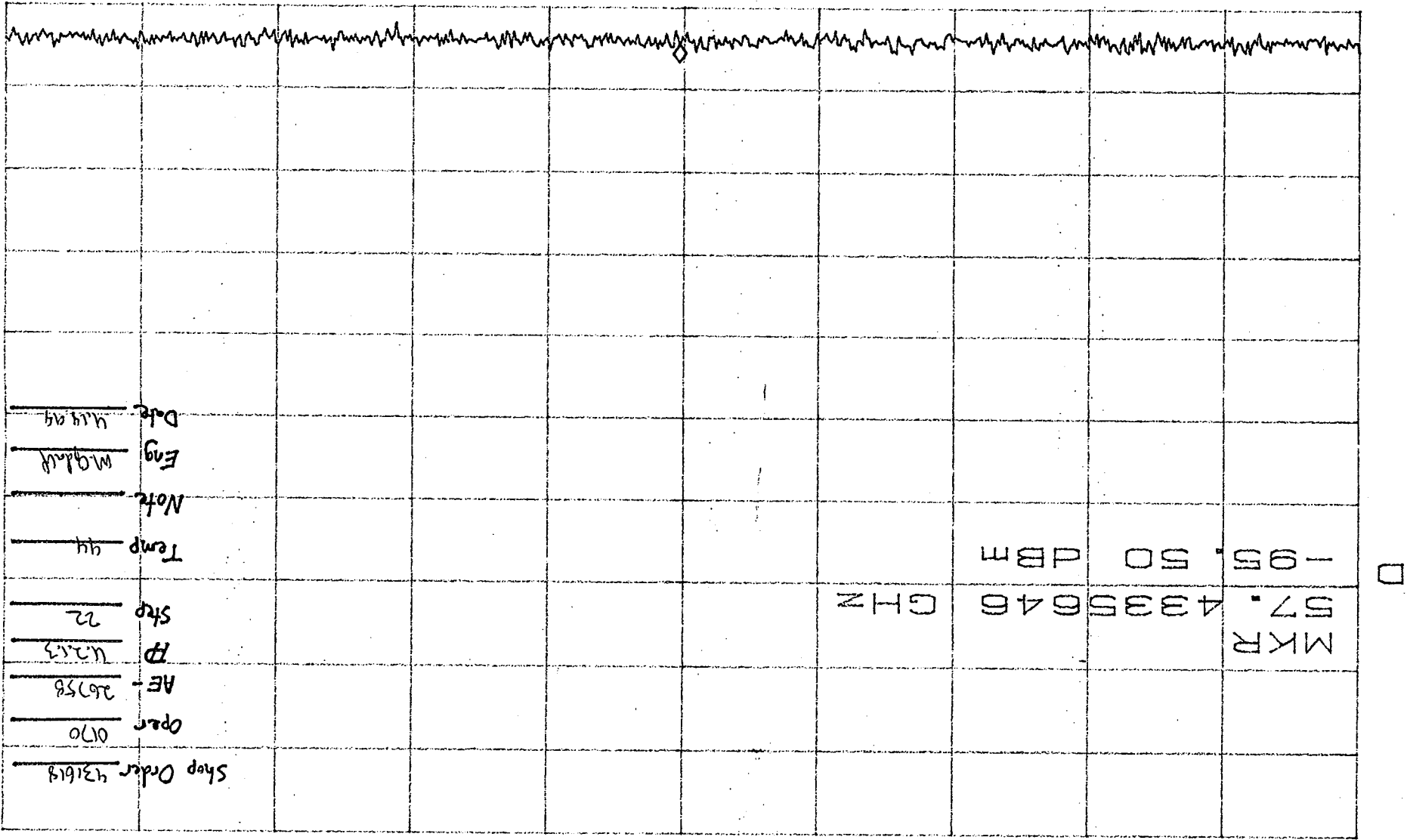


CENTER 57.1471112GHz SPAN 500.0kHz
*RBW 3.0kHz *VBW 3.0kHz SWP 140ms

7A
190

4/20/98

CL 30.0dB VAVG 41 MKR -95.50dBm 57.4335646GHz RL 0dBm



CENTER 57.4335629GHz SPAN 500.0kHz *RBW 3.0kHz *VBW 3.0kHz SWP 140ms

CL 30.0dB

VAVG 15

MKR -96.00dBm

RL 0dBm

10dB/

57.5767904GHz

D

MKR

57.5767904 GHz

-96.00 dBm

Shop Order 471614

Oper 0470

AE 26758

TP 4.2.13

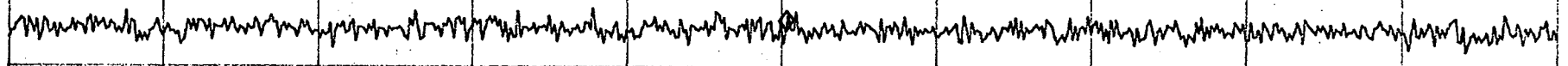
Step 22

Temp 44

Note

Eng W. G. L. P.

Date 4.16.94



CENTER 57.5767887GHz

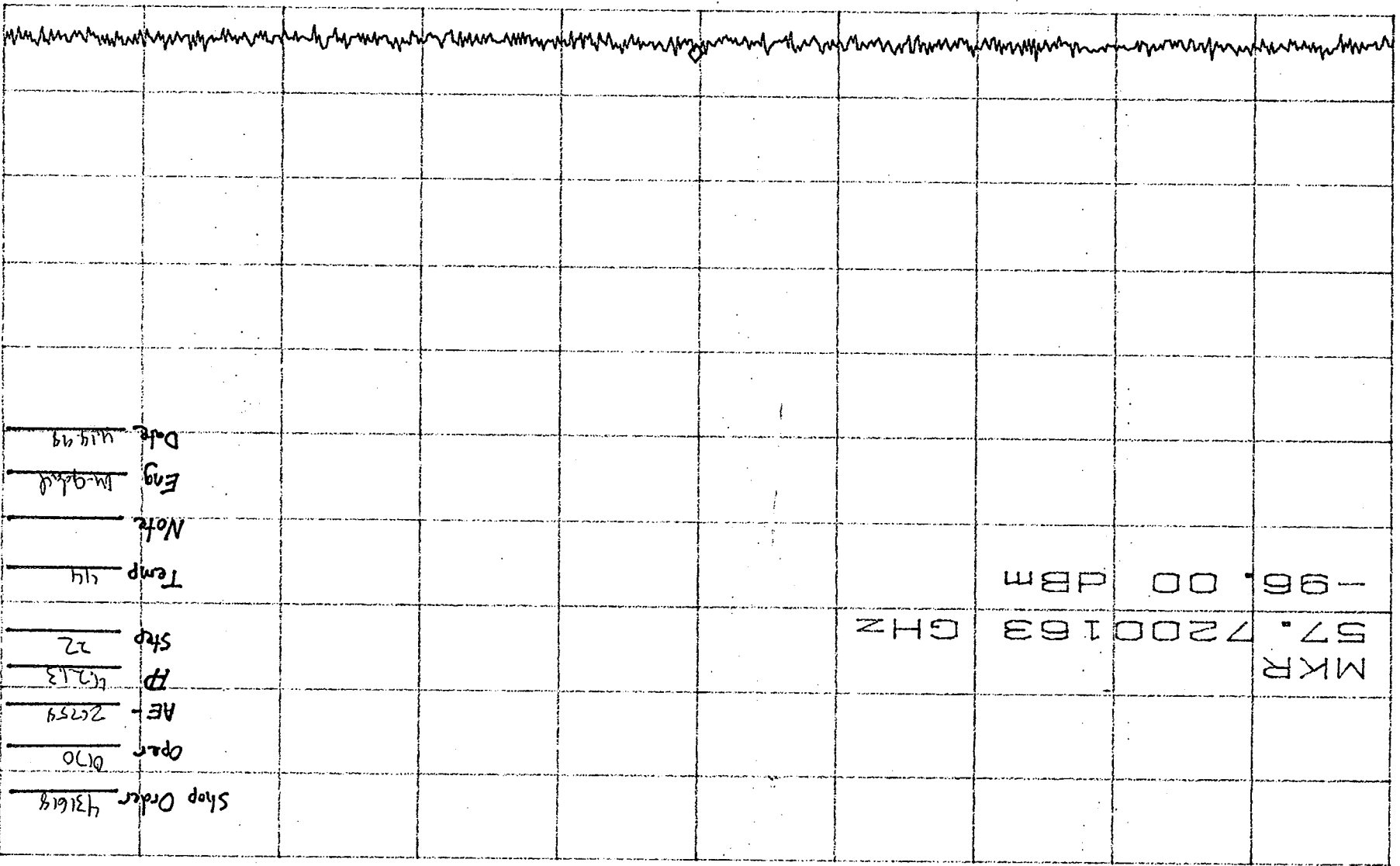
SPAN 500.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 140ms

CL 30.0dB VAVG 38 MKR -96.00dBm 57.7200163GHz RL 0dBm



Shop Order 431618
 Oper 0170
 AE 20254
 PP 4213
 Stop 22
 Temp 44
 Note
 Eng Im-gnd
 Date 4/14/99

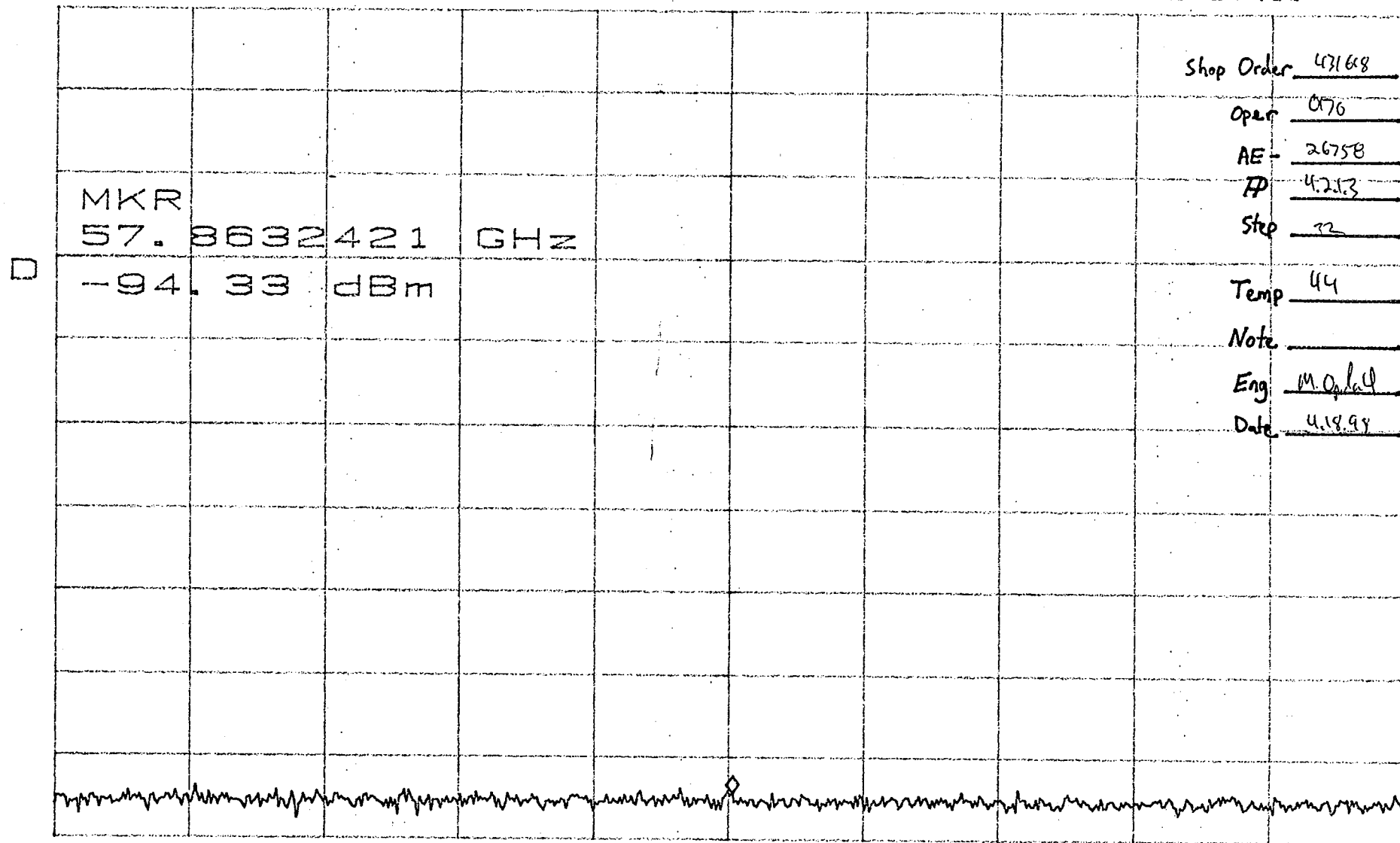
CENTER 57.7200146GHz SPAN 500.0KHz *RBW 3.0KHz *VBW 3.0KHz SWP 140ms

190
 88 30 98

CL 30.0dB
RL 0dBm

VAVG 63
10dB/

MKR -94.33dBm
57.8632421GHz



CENTER 57.8632404GHz
*RBW 3.0kHz *VBW 3.0kHz

SPAN 500.0kHz
SWP 140ms

CL 30.0dB

RL 0dBm

10dB/

MKR -67.50dBm

114.5806760GHz

MKR
114.5806760 GHz
-67.50 dBm

Shop Order 438616

Oper 0170

AE 26758

FD 4.2.1.3

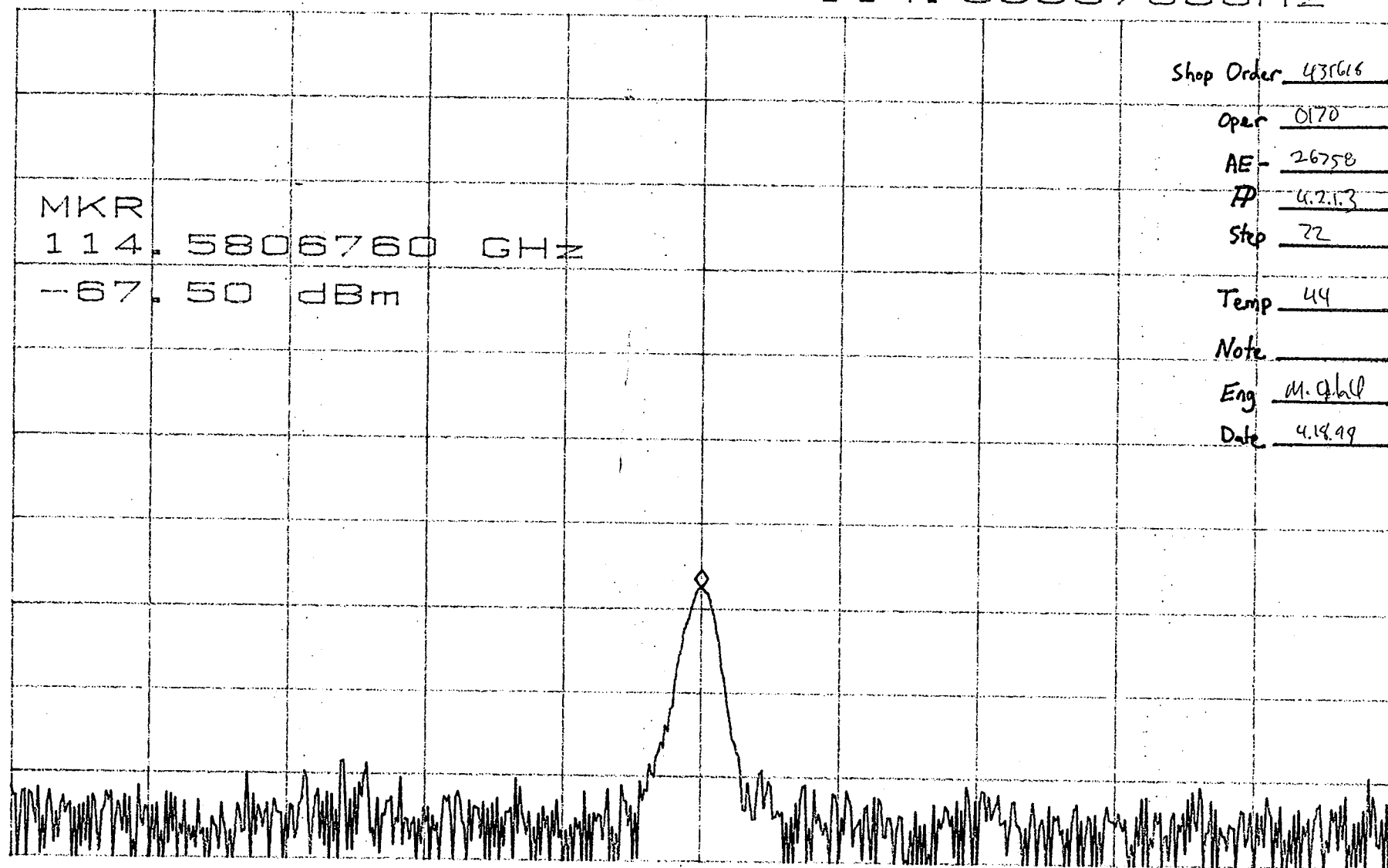
Step 72

Temp 44

Note

Eng M. Ghil

Date 4.18.99



CENTER 114.5806760GHz

SPAN 200.0kHz

*RBW 3.0kHz

*VBW 3.0kHz

SWP 67.0ms



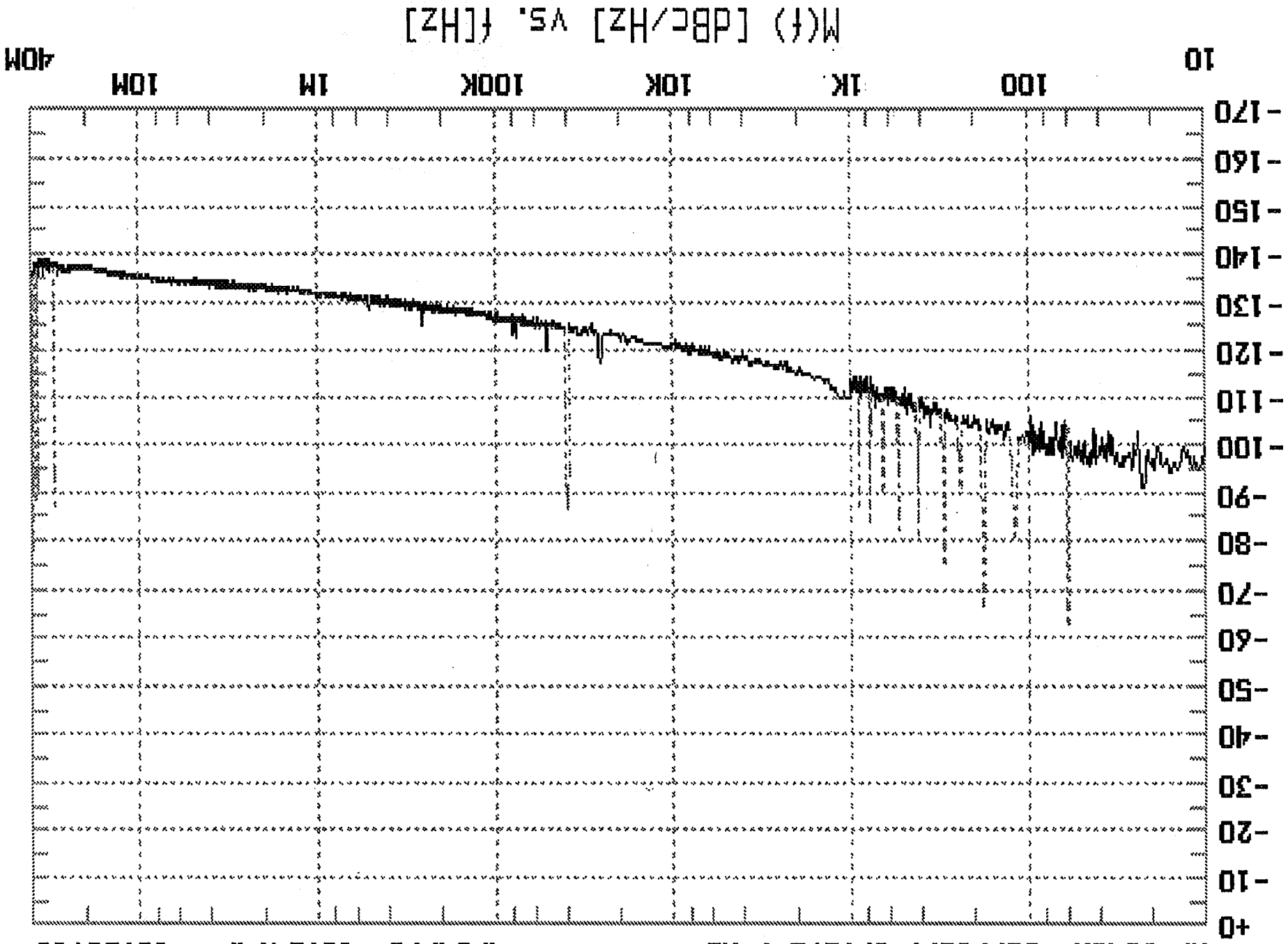
Section 6A: AM/FM Noise Levels - F03

The following pages contain the results of the AM and FM Noise tests for PLO F03. The plot of the FM Noise Test shows that (f) [dBc/Hz] falls under -100 dBc/Hz at all frequencies more than 1 MHz from the carrier. The plot of the AM noise test shows that outside of 1 MHz, AM noise is less than -132.

AM Test, PLO F03

OPR 0135

HP 3048A Carrier: 57.29E+9 Hz 4/04/98 15:24:47 - 15:28:15 AM



$E(f)$ [dBc/Hz] vs. f [Hz]

40M

10M

1M

100K

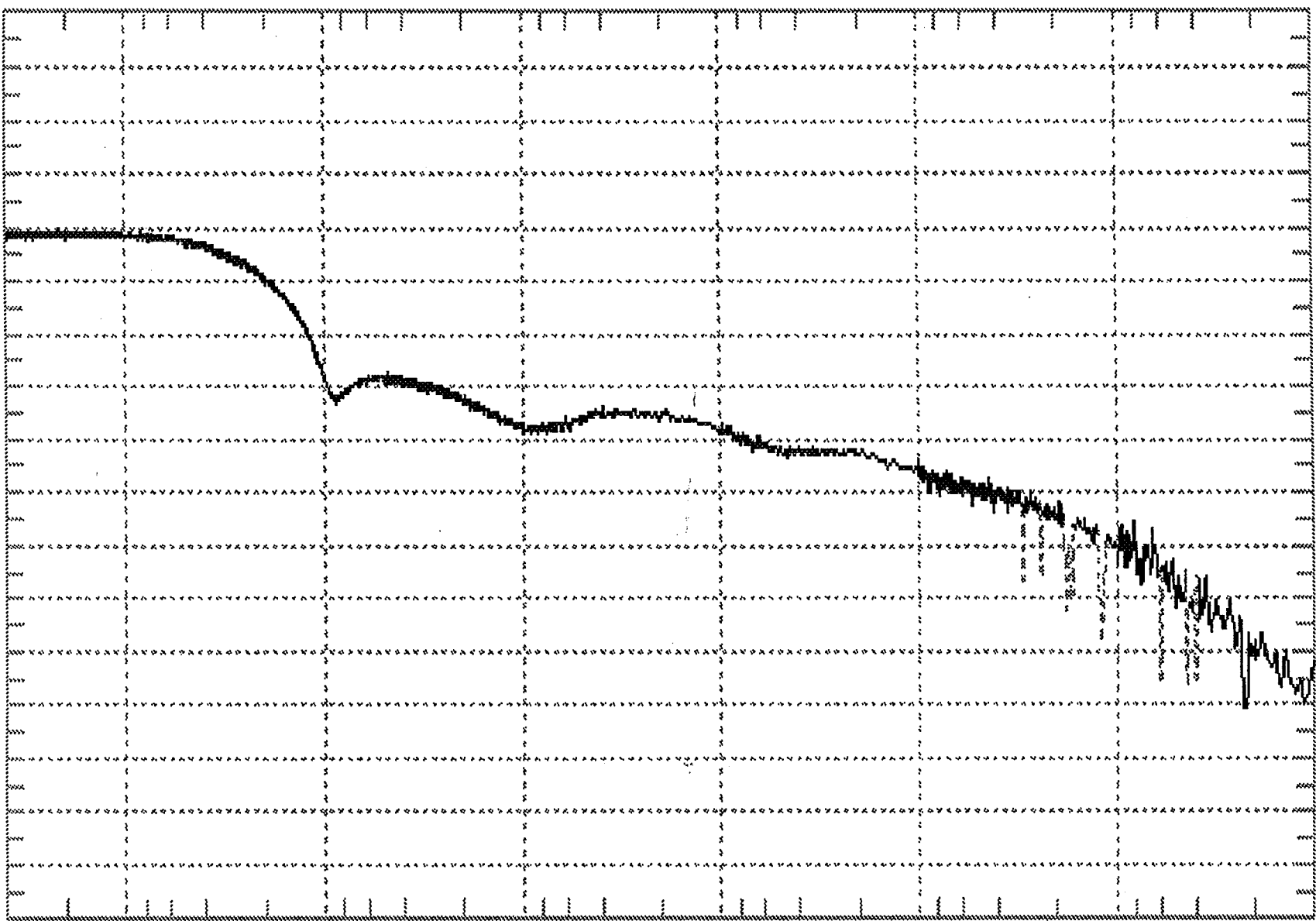
10K

1K

100

10

-170
-160
-150
-140
-130
-120
-110
-100
-90
-80
-70
-60
-50
-40
-30
-20
-10
+0



HP 3048A Carrier: 57.29E+9 Hz 4/03/98 18:14:16 - 18:17:49

FM Noise Test, PLO F03

09ER 0135 @ Ambient

65

Section 6B: AM/FM Noise Levels - F04

The following pages contain the results of the AM and FM Noise tests for PLO F04. The plot of the FM Noise Test shows that (f) [dBc/Hz] falls under -100 dBc/Hz at all frequencies more than 1 MHz from the carrier. The plot of the AM noise test shows that outside of 1 MHz, AM noise is less than -135.

3 Oct 96

3.2.1.5.6 Frequency drift caused by aging. The frequency drift caused by aging shall be as estimated over the instrument life specified in 3.2.3.2.

3.2.1.6 RF output power. The radio frequency (RF) output power shall be between 11 dBm and 20 dBm.

3.2.1.7 Output power stability. The output power stability is the sum of power variations with temperature, bias voltage, hysteresis, and load, and power drift caused by aging over the specified ranges and duration in 3.2.1.5.2 through 3.2.1.5.6. The overall output power variation shall be no greater than ± 1.5 decibels (dB).

3.2.1.8 Load VSWR. With a load VSWR of 2.0:1 or less applied to the output the unit shall meet all specified requirements. No damage or performance degradation shall occur to the unit at any VSWR, including short- and open-circuit conditions.

3.2.1.9 AM noise. The double sideband (DSB) amplitude modulation (AM) noise in a 1 Hz bandwidth shall be a minimum of 130 dB minimum below the carrier at all frequencies greater than 1 MHz away from the carrier frequency.

3.2.1.10 FM noise. The frequency modulation (FM) noise in a 1 Hz bandwidth shall be a minimum of 100 dB below the carrier at all frequencies greater than 1 MHz away from the carrier frequency.

3.2.1.11 Spurious and subharmonic signals. Spurious and subharmonic outputs shall be a minimum of 90 dB below the RF output power.

3.2.1.12 Harmonics. All harmonic signals shall be a minimum of 30 dB below the RF output power.

3.2.1.13 Microphonics. The unit shall meet the requirements of 2.2.1.5 when subjected to the random vibration level of 10^{-3} g^2/Hz from 20 Hz to 200 Hz and the sinusoidal vibration level of 0.1 g peak-to-peak from 20 Hz to 120 Hz.

3.2.1.14 Warm-up time. The maximum warm-up time of the unit shall not exceed 30 minutes.

3.2.1.15 Grounding and shielding. The DC bias shall be returned to its power source via an electrically isolated ground terminal. Shielded conductors shall be used to prevent undesired radiation and to shield circuits from stray electric fields.

3.2.1.16 Input voltage protection. The unit shall be internally protected to prevent damage/performance degradation caused by an intermittent short circuit on any input voltage. The unit shall not suffer damage as a result of momentary application of two times the designated input voltage.

3.2.1.17 Reverse polarity protection. The unit shall be protected against the application of a reverse polarity voltage to the input terminals.

3.2.1.18 Electromagnetic interference (EMI) control. The unit shall be designed to ensure a minimum of 90 dB attenuation from the metallic structure enclosure, RF connectors, joints and power lines, or any other lead penetrating the case over the frequency range from DC to 8.0 GHz.

3.2.2 Physical characteristics

3.2.2.1 Configuration and envelope dimensions. The configuration, dimensions, tolerances, mounting provisions, and other physical details of the unit shall be as shown in drawings 1348360 and 1348325.

3.2.2.2 Weight. The weight of the unit shall not exceed 2.0 pounds. This weight is inclusive of the reference crystal oscillator defined in drawing 1348325.

3.2.3 Operability

3.2.3.1 Reliability. The unit shall be designed to have a reliability of not less than 0.979 during a three-year operational life on orbit (with a five-year goal) following up to five years in storage and two years of integration and test.

Measurement Parameter Summary

as. Type : PHASE LOCK LOOP
Start Freq : 10 Hz
Stop Freq : 40.E+6 Hz
Min. Aves : 4

K_VCO Method: MEASURED

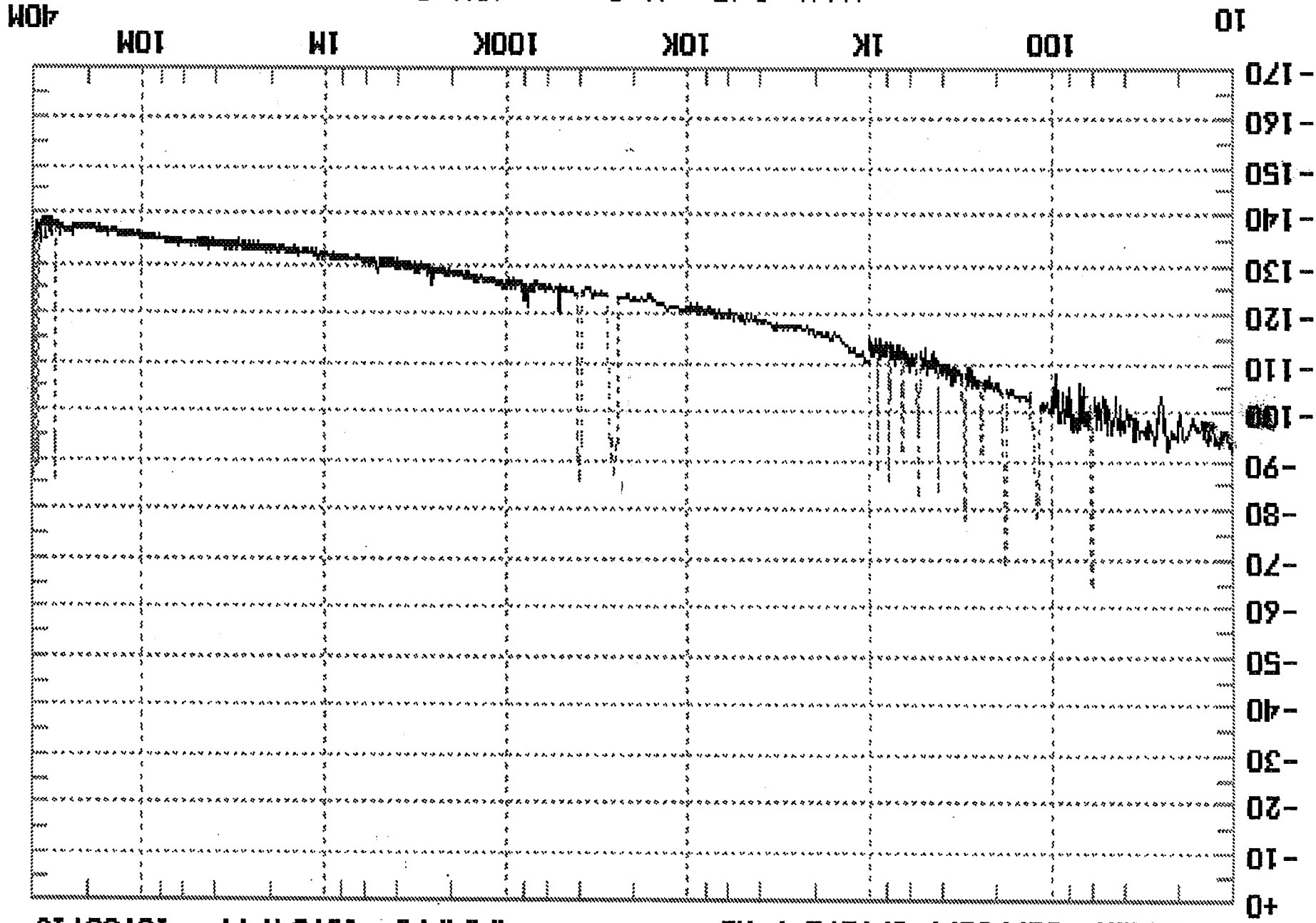
K_vco : 104.7E+3 Hz/Volt
Loop Suppr. : NOT VERIFIED

Carrier Freq: 57.29E+9 Hz
Det. In Freq: 310.06E+6 Hz
Entered Kvco: 100.E+3 Hz/Volt
Center Voltg: 0 Volts
Tune Range : 5 Volts
Ph. Detector: 5 TO 1600 MHz
K_phi Method: MEASURED
K_phi : 261.E-3 V/Rad

Closed PLL BW: 5.444E+3 Hz
Pk Tune Rnge: 415.3E+3 Hz
Assumed Pole: 150.E+3 Hz
UUT : USER'S SRCE, MAN
Ref. Srce : 8662A , SYS
Ext. Tmbase : NOT IN USE
Dn Converter: 70427A , SYS, VCO
HP11848A LNA: OUT

5/0 431618
 AM Test PLO F04
 OFF 0135 @ Ambient

HP 3048A Carrier: 57.29E+9 Hz 4/04/98 15:54:44 - 15:58:13



7A 190 APR 6 98

Measurement Parameter Summary

as. Type	: AM NOISE	K_dsc Method:	DOUBLE SIDED SPUR
Start Freq	: 10 Hz	Spur Ampl.	: -26 dBc
Stop Freq	: 40.E+6 Hz	Spur Freq.	: 1.02E+6 Hz
Min. Aves	: 4	K_phi	: 5.646E-3 V/Rad
Carrier Freq:	57.29E+9 Hz	UUT Source	: USER'S SRCE, MAN
Det. In Freq:	57.29E+9 Hz	CAL Source	: USER'S SRCE, MAN
Ph. Detector:	EXTERNAL	AM Detector	: USER'S DEV, MAN
		HP11848A LNA:	IN

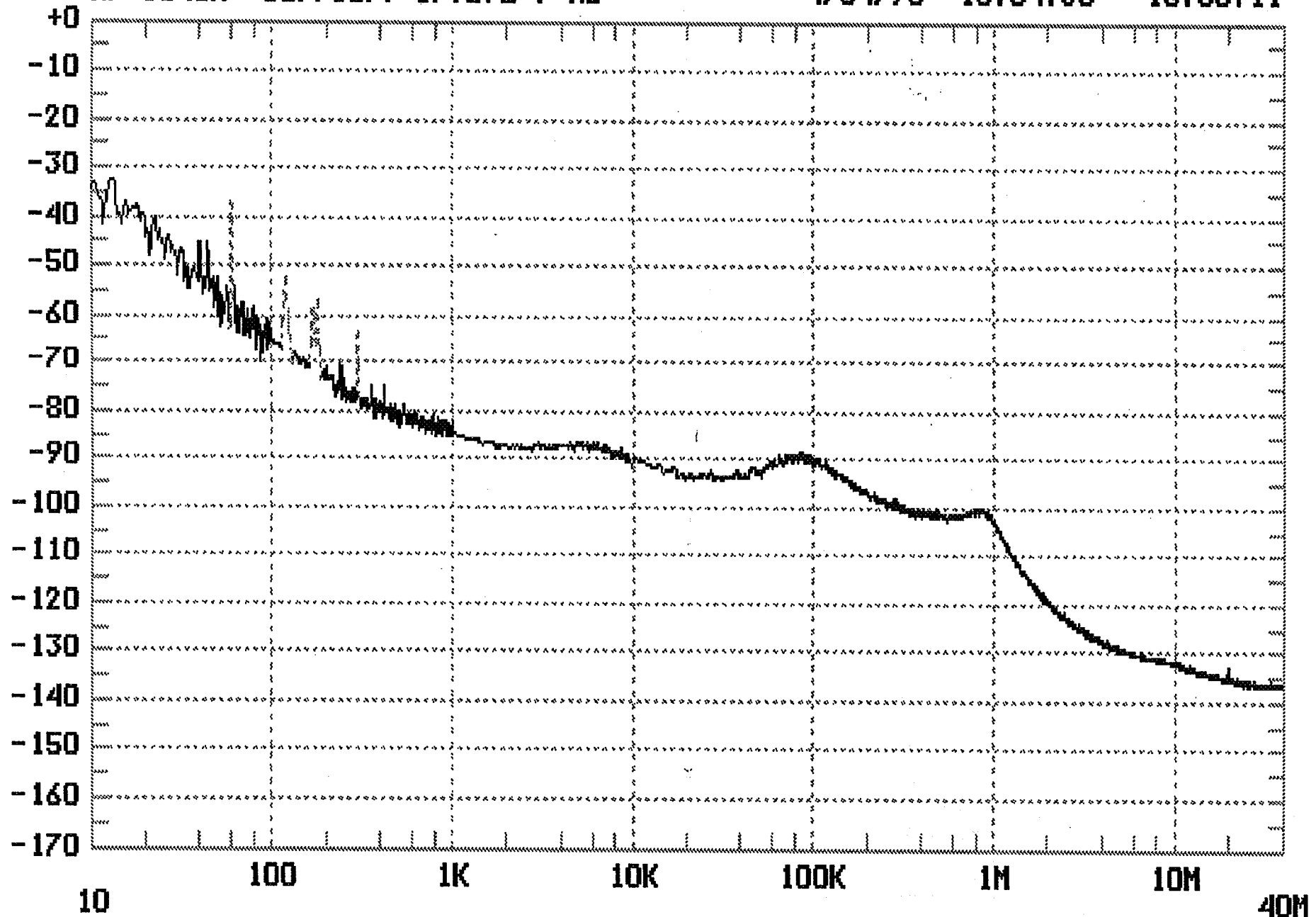
FM Test PLO F04

S/O 431618

OPER 0135 Ambient

HP 3048A Carrier: 57.29E+9 Hz

4/04/98 16:04:38 - 16:08:11



$L(f)$ [dBc/Hz] vs. f [Hz]

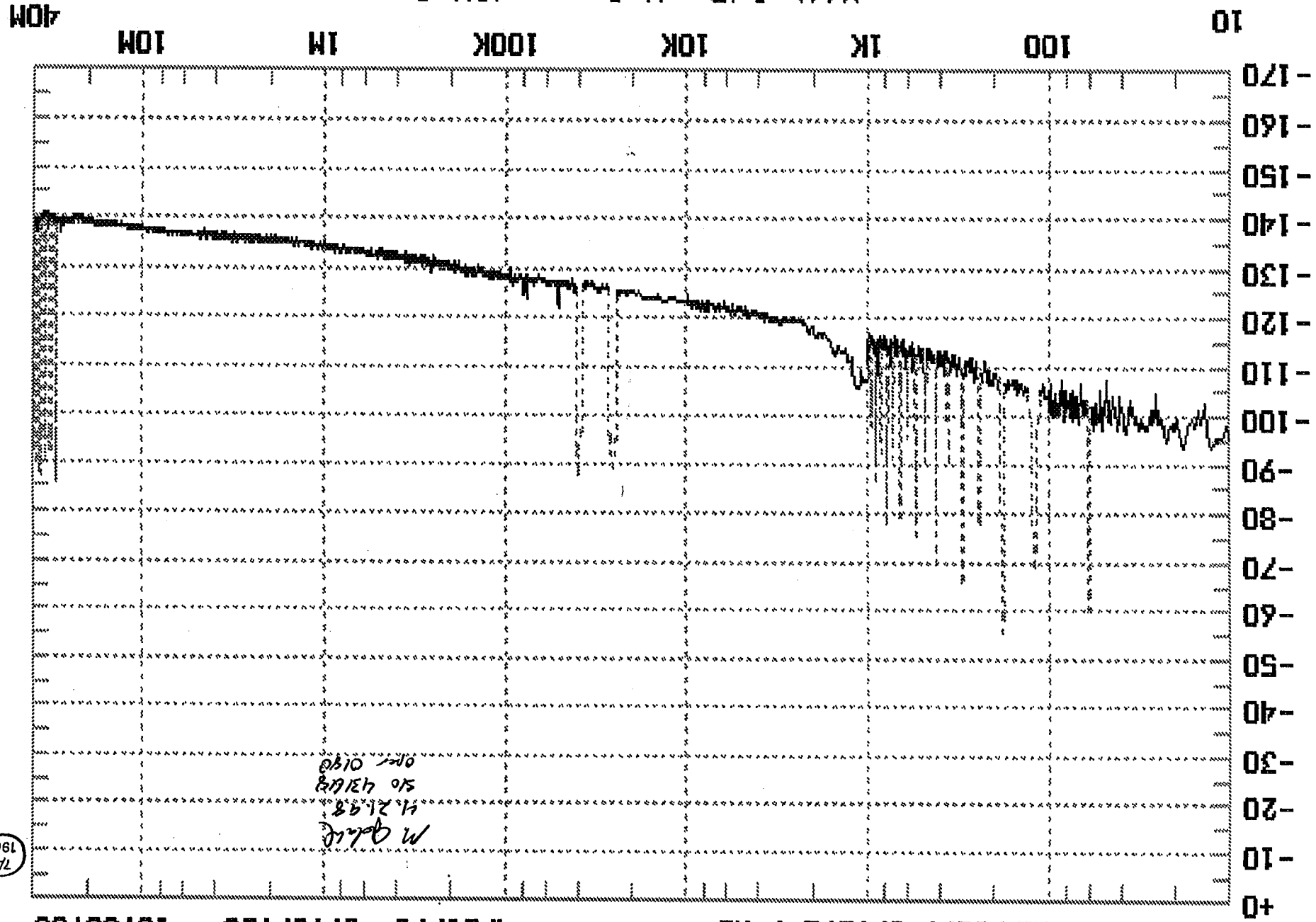
7A 190 APR 6 98

Final, 0. AM Test

HP 3048A Carrier: 57.29E+9 Hz

4/21/98 09:57:28 - 10:00:55

M 9.41E
4.21E8
50.4316E
0.010

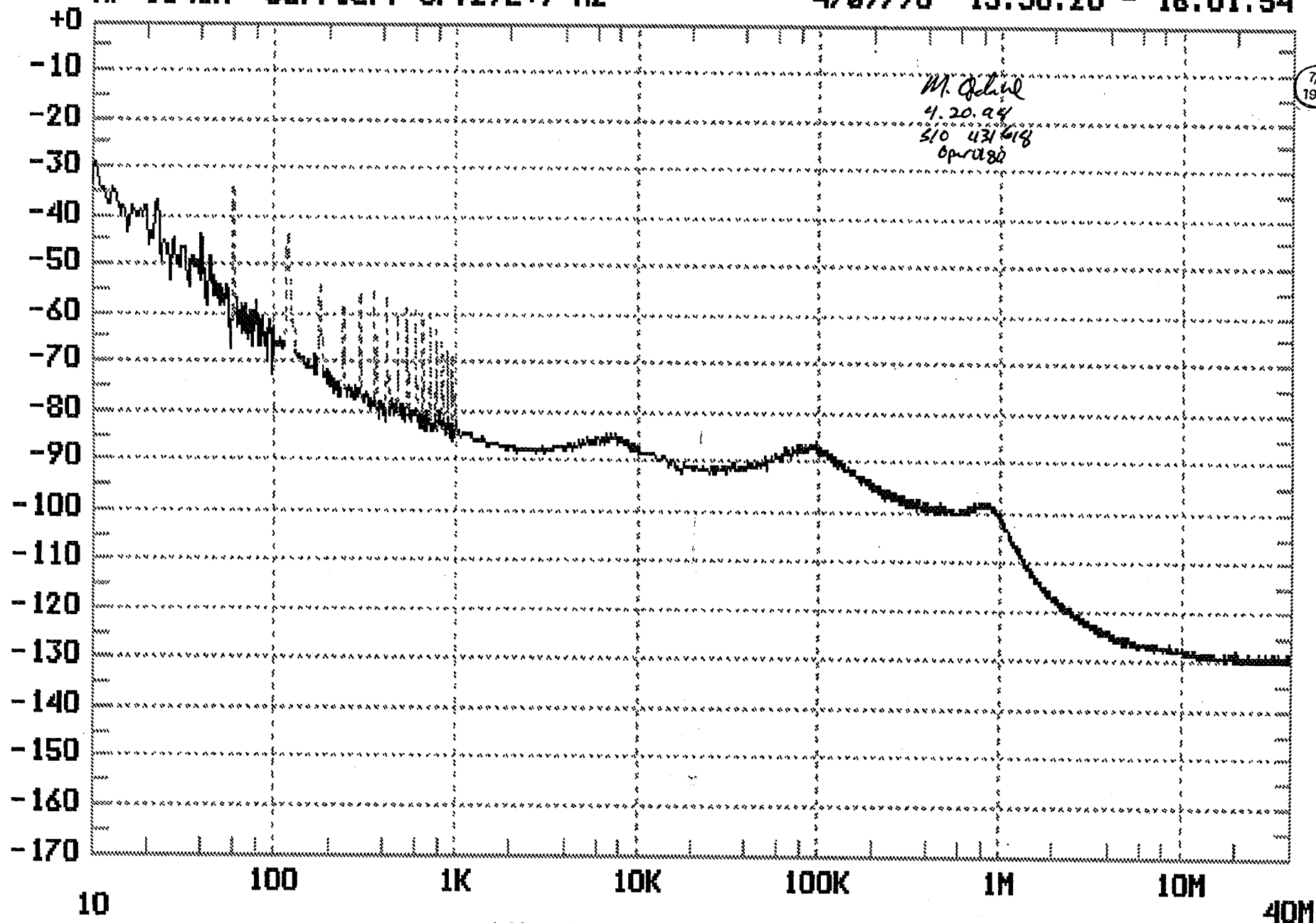


190
24
09 21 98

PLO F04 Final FM Test

HP 3048A Carrier: 57.29E+9 Hz

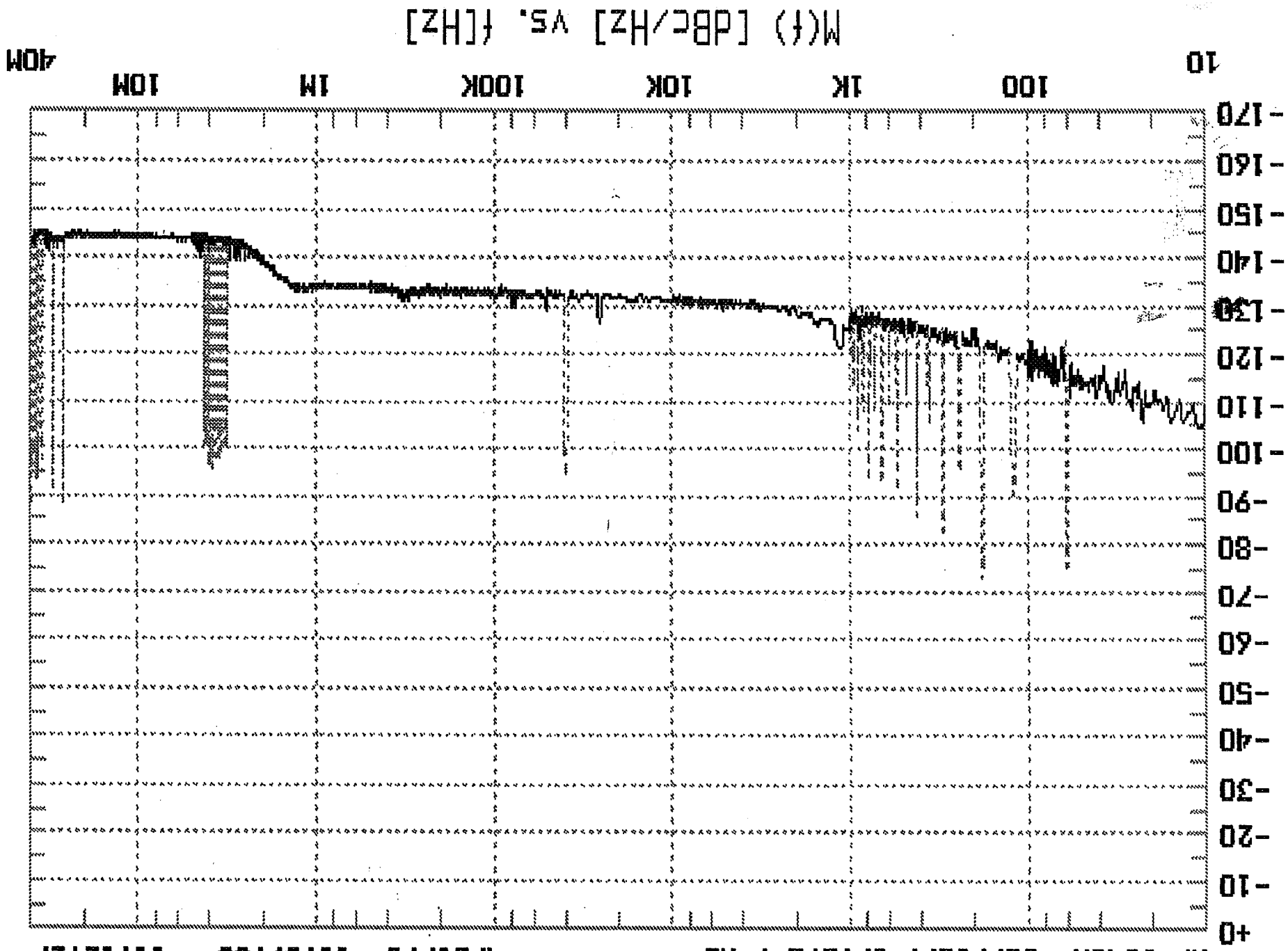
4/07/98 15:58:20 - 16:01:54




$\epsilon(f)$ [dBc/Hz] vs. f [Hz]

AM Noise Measurement, Source Module

HP 3048A Carrier: 57.29E+9 Hz 4/21/98 11:09:00 - 11:12:27



 NASA National Aeronautics and Space Administration				Report Documentation Page			
1. Report No. ---		2. Government Accession No. ---		3. Recipient's Catalog No. ---			
4. Title and Subtitle Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report				5. Report Date 10 June 1998			
				6. Performing Organization Code ---			
7. Author(s) D. Pines				8. Performing Organization Report No. 11172			
9. Performing Organization Name and Address Aerojet 1100 W. Hollyvale Azusa, CA 91702				10. Work Unit No. ---			
				11. Contract or Grant No. NAS 5-32314			
12. Sponsoring Agency Name and Address NASA Goddard Space Flight Center Greenbelt, Maryland 20771				13. Type of Report and Period Covered Final			
				14. Sponsoring Agency Code ---			
15. Supplementary Notes ---							
16. ABSTRACT (Maximum 200 words) This is the Performance Verification Report, EOS Phase Locked Oscillator Assy, P/N 1348360-1, S/N F03 and F04 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).							
17. Key Words (Suggested by Author(s)) EOS Microwave System				18. Distribution Statement Unclassified --- Unlimited			
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of pages		22. Price ---	

NASA FORM 1626 OCT 86

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Block 10. Work Unit No. Provide Research and Technology Objectives and Plants (RTOP) number.

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4. TITLE AND SUBTITLE Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report			5. FUNDING NUMBERS NAS 5-32314	
6. AUTHOR(S) D. Pines				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Aerojet 1100 W. Hollyvale Azusa, CA 91702			8. PERFORMING ORGANIZATION REPORT NUMBER 11172 10 June 1998	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Greenbelt, Maryland 20771			10. SPONSORING/MONITORING AGENCY REPORT NUMBER ---	
11. SUPPLEMENTARY NOTES ---				
12a. DISTRIBUTION/AVAILABILITY STATEMENT ---			12b. DISTRIBUTION CODE ---	
13. ABSTRACT (Maximum 200 words) This is the Performance Verification Report, EOS Phase Locked Oscillator Assy, P/N 1348360-1, S/N F03 and F04 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).				
14. SUBJECT TERMS EOS Microwave System			15. NUMBER OF PAGES	
			16. PRICE CODE ---	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR	

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CHECKED BY:		DATE	JOB NUMBER: DATE	
APPROVED SIGNATURES			DEPT. NO.	DATE
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Systems Engineer (R. Platt) <u><i>R. Platt</i></u>			8311	7/30/98
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